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Results for Greenland halibut, American plaice and Atlantic cod of the Spanish survey in NAFO Div. 3NO for the period 1997-2013

by

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Abstract

Greenland halibut (*Reinhardtius hippoglossoides*), American plaice (*Hippoglossoides platessoides*) and Atlantic cod (*Gadus morhua*) indices from the bottom trawl survey that Spain carries out in Spring since 1995 in Div. 3NO of the NAFO Regulatory Area are presented. Biomass, stratified mean catches and mean number per tow for the three species are presented since 1997, year in which the survey extended the depth strata. Mean catch per town, length distribution and age distribution are presented for the last five years (2009-2013). Greenland halibut biomass and abundance estimates presented a decreasing trend since 1999, cut in year 2007 with an increase, reaching in 2009 the highest value in the series. In 2011-2013 the biomass drops under the 2008 value. In last years it can be seen a presence of juveniles, mainly in 2004, but the greatest lengths have failed, although in 2009 there is a quite good presence of individuals of ages 6-7 and in 2010 between 5-7. In 2011-2013 the presence of all ages is poor. For American plaice we can see an increasing trend along the whole period, reaching a maximum of mean catch and number in 2006. The greatest recruitment in the presented series occurred in 2004 and we can follow their mode along the years. No good recruitments were seen since then. For Atlantic cod it can be seen a general decreasing in the biomass between 2002 and 2005 and an increasing since then, especially in 2006 and, higher, in 2009-2011, decreasing again since then. For this species, an increase in the recruitment can be seen in 2004 and 2005, and in 2007-2008 the youngest length classes were much over the rest of the length classes. With the 2006 cohort the series reaches the maximum number of its historical values at five years in 2011. There have been no good recruitments since 2009.

Material and Methods

Since 1995, Spain carries out a Spring-Summer survey in the NAFO Regulatory Area of Div. 3NO. To 2000, the survey was on board the C/V *Playa de Menduíña* with a net trawl type *Pedreira*. In 2001 this vessel was replaced by the R/V *Vizconde de Eza*, using a trawl net type *Campelen*. To know more details about the technical specifications of the surveys, see Walsh *et al.*, 2001 and González Troncoso *et al.*, 2004.

The catch of each haul was sorted and weighted into species and a sample of each species was taken in order to measure the length distribution. For Greenland halibut, American plaice and Atlantic cod each individual of the sample was measured to the total length to the nearest lower cm. We present the total annual indices of biomass and abundance for the period 1997-2013. In 1995 and 1996 only the less deep strata were surveyed, so these years are not representative for these species, thus they are not included in the analysis.

The number of valid tows, the depth strata covered and the dates of the survey series (1997-2013) are presented in Table 1. Table 2 shows the swept area and number of hauls by stratum for the last five years (2009-2013). To know the results of the rest of the years, see González-Troncoso et al., 2013.

For each species, all the indices are presented transformed until 2000 and no-transformed in the period 2002-2013. In year 2001 there are data transformed from the former vessel with original data from the new vessel. To know more about the transformation, see González-Troncoso *et al*., 2005 and González-Troncoso *et al*., 2006. We present the mean catch, the length distribution in number by sex and year; and the mean numbers with their mean length and mean weight by age for the years 2009-2013. To see the results of the rest of the years, see González-Troncoso et al., 2013.

Figure 1 presents the maps with the distribution of the catches of the three species during the 2013 Spanish 3NO survey.

Results

Greenland halibut

The Greenland halibut stock in Subarea 2 and Div. 3KLMNO is considered to be part of a biological stock complex, which includes Subareas 0 and 1. Abundance and biomass indices were available from research vessel surveys by Canada in Div. 2J+3KLMNO (1978-2012), EU in Div. 3M (1988-2012) and EU-Spain in Div. 3NO (1995-2012). In 2003 the Fisheries Commission implemented a fifteen years rebuilding plan for this stock, establishing progressively decreasing TACs. The catches in 2004-2010 have exceeded the rebuilding plan TACs by 30% on average, despite reductions in fishing effort. In 2011 and 2012, only STATLANT 21A catch data was available, so the data was inconsistent with regards last years assessment.

The exploitable biomass (age 5+) declined to low levels in 1995-97 due to very high catches and high fishing mortality. It increased during 1998-2000 due to greatly reduced catches, much lower fishing mortality and improved recruitment. Biomass increased over 2004-2008 with decreases in fishing mortality. However, it has shown decreases over 2008-2012, in part due to weaker year-classes recruiting to the biomass. The current assessment is based on surveys and results since 2004 shows greater divergence which complicates interpretation of overall status, but generally suggest stability in stock biomass over 2008-2012. The recruitment estimates for 2012 are very low (NAFO, 2013).
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Mean catches and Biomass

Table 3 shows the mean catches and their variance per haul and year for Greenland halibut in the period 2009-2013. Biomass per stratum for the same period is presented in Table 4. Annual total biomass, as the biomass corresponding to ages 5+ and 10+, and mean weight per tow with the total variance per year are presented in Table 5 for years 1997-2013. In Figure 2 we compare the mean catch per tow with the mean number per town. Figure 3 presents the biomass per swept area per stratum and their total variance per year. In Table 6 we present the length-weight relationship parameters *a* and *b* for 2009-2013.

Greenland halibut biomass decreased since 1999 to 2006, and from 2007 to 2010 the biomass increased, mainly in 2009 and 2010, when the biomass reaches the highest values in the series. In 2011-2013, the biomass decreased to a half of the 2010 value, reaching a level lower than in 2008. The lowest biomass value was in 2002. The biomass 5+ has had the same trend as the total biomass with a marked increase during 2008-2010, being the highest values of the series, and a decreasing in 2011-2013. Since 2007, the 5+ biomass represents more than the 90% of total biomass. In the case of the 10+ biomass, it has been increased since 2008, reaching the maximum in 2012. Despite of this, with respect to the mean number per tow, although in the 2008-2010 period there was a substantial increase in the numbers, this increase is not as the increase in biomass, reaching the level of the 2001 numbers per town, but still far of the values of the first years of our series. Since 2009, there has been a decrease in the numbers.

Length Distribution

Table 7 presents the mean number per tow by sex and year for 1997-2013. Table 8 shows this index by length, sex and year, with the number of samples in which there were length measures, the total number of individuals measured in these samples, the sampled catch and the range of lengths met, as the total catch of this species and the total hauls made in the survey, for years 2009-2013. In Figures 4 and 5 we can follow the evolution along the years. We can follow a mode since 1997 until 2001, but since then no high new values appears. The highest recruitments were in 1997, 2001 and 2004. In 2006 and 2007 the small individuals (around 12-14 cm, corresponding to 1 year of age) are the mode of the length distribution range, but all the length ranges were poor. The same occurred in 2011, with a mode in the lengths 14-15, that corresponds to age 1. In 2009 and 2010 an increase in number for lengths between 38-52 cm (ages 5-7) can be seen, but they almost disappear in 2011. It seems that the high increase in the biomass in 2009-2010 was due to the higher presence of these length classes, while at the

beginning of the series the presence of juveniles was stronger. In 2012 and 2013 the presence of all the length classes is poor.

Age numbers

We present the mean number by age, sex and year in Table 9 for 2009-2013 and the total by year (for the entire series) in Figure 6. Individuals between 0 and 20 years were caught in the period 1997-2013 and since 2002 more number of younger individuals was caught. It can be due to the change of gear and/or vessel. We can follow three conspicuous cohorts in our series, the 1994-1996 cohorts (ages 1, 2 and 3 in 1997). Cohorts from following years seem to be weaker than those ones, but more constant. And 2001-2003 cohorts appear to be quite strong, as we can see in recent years, particularly 2002 one, and these cohorts seem to be present in year 2008 (ages 5 to 7) and in 2009 (ages 6 to 8). In 2010 the mode of the ages is between 5 and 7 years, which can imply that the cohorts of years 2004 and 2005 could be better than it can be seen in the graph. In 2013 the mode is at 6 years old, but the presence of all the years classes, including the recruitment, is very weak.

Mean length and mean weight

Mean length and weight at age by sex for 2009-2013 are presented in Tables 10 and 11, and for the entire series in Figures 7 and 8. It seems that the greatest ages were increasing their mean length and weight until 2003, and falling in the youngest individuals. In 2011-2013 the mean length and weight is more or less constant, although it seems to be lower for the oldest ages. The total mean length and the total mean weight have an increase since 2006.

American plaice

There was no directed fishing of American plaice in 1994 and there has been a moratorium since 1995. Even under moratorium, catches increased substantially from 1995 to 2003 and then decreased. Biomass and SSB are very low compared to historic levels. SSB declined to the lowest estimated level in 1994 and 1995. It has increased since then but still remains very low. Recruitment has been generally poor for the past two decades; however, the 2003 year-class is the largest since the 1985 year-class (NAFO, 2013).

Mean catches and Biomass

American plaice mean catches and SD by stratum are presented in Table 12 for 2009-2013. Biomass for stratum for the same period is presented in Table 13.

The annual entire time series (1997-2013) of biomass and stratified mean catches with their SD estimates for American plaice are presented in Table 14. Estimated parameters *a* and *b* values of length-weight distribution are presented in Table 15 for 2009-2013.

The American plaice indices show a general increasing trend along the years, agree with the results from the Canadian surveys. We can see a decreasing in 2001 and 2002 and an increasing since then, reaching the maximum historical value in 2006 and 2008, with a virtually identical

value, remained in 2007 at the same level than in 2005. But in 2009 this increasing trend was broken and the value is below the 2001 value, both in weight and in numbers, following with a general increase in 2010-2013 (Figures 9 and 10).

Length Distribution

Table 16 shows the mean number per tow by sex and year for 1997-2013, and Table 17 the same index by length for 2009-2013, besides the sampled size and catch. Figures 11 and 12 show length distribution by sex and year for the entire period. Between years 2000 and 2004 we can follow a mode that then disappeared; probably the 1998 year-class. In 2004 there is a great presence of juveniles (8 cm) and in 2005 the mode appears around 14 cm, following with a mode of around 20 cm in 2006, 24 in 2007, 26 in 2008 and 28 in 2009. This mode can be seen in around 30 cm in 2010, 32 cm in 2011and 34 cm in 2012, but the mode length in those years is 28, as in 2009. In 2008 and 2010 there is a quite good presence of juveniles (individuals of 10-12 cm in 2008 and 12 cm in 2010) that does not appear in 2011-2013.

Age numbers

We present the mean number per tow at age by sex and by year (2009-2013) in Table 18 and the total by year (1997-2013) in Figure 13. The ALK is the 3N Canadian one. We can follow a cohort without problems since the year 2000, starting in individuals of 2 years old (1998 cohort), reaching 15 year old in 2013 (almost disappeared); a second cohort, weaker, can be followed since 1999, starting in 2 years old (1997 cohort). Another cohort from the year 2002 (one year old in 2003), can be followed until 2013, reaching 11 years old, although it failed at 5 years old. And the 2003 cohort (one year in 2004) is a very strong cohort, reaching in 2008 five years old and the largest number in the whole series, and in 2013 ten years old. The cohorts from 2005 to 2007 seem to be quite good, too.

Mean length and mean weight

Mean length and weight at age by sex for 2009-2013 are presented in Tables 19 and 20, and shown in Figures 14 and 15. The mean length is more or less stable in all ages, at least since 2002. The same occurs with the mean weight, although with more variations. The major variations appear in the oldest ages studied: 12+ years old individuals. From 1997 to 1999 a general decreasing in the two means is observed.

Atlantic cod

Atlantic cod in Divisions 3NO has been under moratorium to directed fishing since 1994. According to the NAFO Scientific Council, the stock of Atlantic cod in Divisions 3NO declined dramatically during the mid-1980s. The 2013 spawning biomass has doubled since 2010 but remains well below B_{lim}. This increase in biomass has been driven by the relatively strong 2005 and 2006 year classes and by fishing mortality values that are amongst the lowest in the time series ($F<0.1$). More recent year classes do not appear strong (NAFO, 2013).

Mean Catches and Biomass

Atlantic cod mean catches and SD by stratum are presented in Table 21 for 2009-2013. Biomass by stratum and year are presented in Table 22 for the same period.

The entire time series (1997-2013) of biomass and stratified mean catches with their SD estimates for Atlantic cod are presented in Table 23. Estimated parameters *a* and *b* values of length-weight relationship are presented in Table 24.

We can see a great variation in the cod indices since 1997 to 2005, but this is due to a few hauls in which the presence of cod was very high. But before year 2006, and apart from those hauls, the catches of cod were very poor. Since 2006 to 2011, an increasing trend in the biomass of this species can be seen. Although the 2006 increase is above all for a single catch of almost 2 tons, in general the catches of Atlantic cod in the survey of 2006 were over the mean. In 2008 a quite high increase is shown, reaching the second highest value in the time series, and in this case there is no haul with very high catches (the maximum was 585.5 kg). In 2009-2012 the biomass reaches new maximums, well above the rest of the values of the series, with a decrease in the 2013 (Figures 16 and 17).

Length Distribution

Table 25 presents the mean number per tow by year for 1997-2013 and this index by length for the period 2009-2013 can be seen in Table 26, besides the sampled size and its catch. Figures 18 and 19 show the length distribution by year (1997-2013). The modal values used to be very low before 2006 except in 2001, and in general all lengths presence was very low, even it is very difficult to follow the modal values. In 2001 we have a good presence of individuals between 36 and 58 cm. From 2006 a series of great modal values along the length distribution can be seen. In 2006 there is two modes in the length distribution, one around 30 cm and another one around 40 cm. There is no good recruitment until 2004, in which the individuals between 12 and 16 cm correspond to the greatest presence in the series, and in 2005 between 24 and 32, with a new mode between 12 and 16 cm, as in last year. In 2007 the youngest lengths dominate the length range, with the highest mode in the lengths 12-16, that are between 2 and 4 times the abundance of the 48 cm length class, the following mode. In 2008-2013 we can follow the evolution of these lengths. In 2013 the presence of all year classes is very poor.

Age numbers

The mean number per tow at age by sex and year (2009-2013) is presented in Table 27 and the total by year (1997-2013) in Figure 20. In accordance with the length distribution, until 2006, the numbers are too low to follow any cohort. But between 2006 and 2008 there are three good cohorts that we can follow (2005-2007 cohorts). With the 2006 cohort the series reaches the maximum number of its historical values at five years in 2011. But it seems that no new good recruitments have occurred since 2009.

Mean length and mean weight

Mean length and weight at age by sex over time are presented in Tables 28 and 29 (2009-2013), and shown in Figures 21 and 22 (1997-2013). For the central ages, the mean length and the mean weight seem to be more or less stable. That does not occur in the oldest ages, with the two parameters very scattered. The total mean length and mean weight present no trend until 2006, with an increase since then.

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Table 1.- Spanish spring bottom trawl surveys in NAFO Div. 3NO: 1997-2013.

Year	Vessel	Valid tows	Depth strata covered (m)	Dates
1997	C/V *Playa de Menduíña*	128	42-1263	April 26-May 18
1998	C/V *Playa de Menduíña*	124	42-1390	May 06-May 26
1999	C/V *Playa de Menduíña*	114	41-1381	May 07-May 26
2000	C/V *Playa de Menduíña*	118	42-1401	May 07-May 28
2001(*)	R/V *Vizconde de Eza*	83	36-1156	May 03-May 24
	C/V *Playa de Menduíña*	121	40-1500	May 05-May 23
2002	R/V *Vizconde de Eza*	125	38-1540	April 29-May 19
2003	R/V *Vizconde de Eza*	118	38-1666	May 11-June 02
2004	R/V *Vizconde de Eza*	120	43-1539	June 06–June 24
2005	R/V *Vizconde de Eza*	119	47-1485	June 10–June 29
2005	R/V *Vizconde de Eza*	119	47-1485	June 10–June 29
2006	R/V *Vizconde de Eza*	120	45-1480	June 7–June 27
2007	R/V *Vizconde de Eza*	110	45-1374	May 29–June 19
2008	R/V *Vizconde de Eza*	122	45-1374	May 27–June 16
2009	R/V *Vizconde de Eza*	109	45-1374	May 31–June 18
2010	R/V *Vizconde de Eza*	95	45-1374	May 30–June 18
2011	R/V *Vizconde de Eza*	122	44-1450	June 5–June 24
2012	R/V *Vizconde de Eza*	122	44-1450	June 3–June 21
2013	R/V *Vizconde de Eza*	122	44-1450	June 1–June 21

(*)For the calculation of the series, 83 hauls were taken from the R/V *Vizconde de Eza* and 40 hauls from the C/V *Playa de Menduíña* (123 hauls in total)

Table 2.- Swept area and number of hauls by stratum. Spanish Spring Surveys in NAFO Div. 3NO: 2009-2013. Swept area in square miles. n.s. means stratum not surveyed.

	2009		2010		2011		2012		2103	
Stratum	Swept area	Tow number	Swept area	Tow number	Swept area	Tow number	Swept area	Tow number	Swept area	Tow number
353	0.0345	3	0.0225	2	0.0349	3	0.0338	3	0.0349	3
354	0.0338	3	0.0225	2	0.0345	3	0.0338	3	0.0338	3
355	0.0233	2	0.0229	2	0.0233	2	0.0229	2	0.0225	2
356	0.0229	2	0.0225	2	0.0229	2	0.0225	2	0.0225	2
357	0.0116	2	0.0225	2	0.0225	2	0.0229	2	0.0236	2
358	0.0341	3	0.0225	2	0.0345	3	0.0330	3	0.0338	3
359	0.0795	7	0.0705	6	0.0806	7	0.0806	7	0.0829	7
360	0.2273	20	0.1628	14	0.2374	20	0.2344	20	0.2231	19
374	0.0225	2	0.0225	2	0.0225	2	0.0229	2	0.0233	2
375	0.0341	3	0.0364	3	0.0360	3	0.0349	3	0.0360	3
376	0.1133	10	0.0788	7	0.1178	10	0.1181	10	0.1305	11
377	0.0225	2	0.0233	2	0.0233	2	0.0229	2	0.0236	2
378	0.0229	2	0.0225	2	0.0240	2	0.0229	2	0.0225	2
379	0.0229	2	0.0229	2	0.0221	2	0.0225	2	0.0240	2
380	0.0229	2	0.0236	2	0.0229	2	0.0229	2	0.0229	2
381	0.0229	2	0.0244	2	0.0233	2	0.0221	2	0.0244	2
382	0.0450	4	0.0233	2	0.0450	4	0.0454	4	0.0484	4
721	0.0229	2	0.0225	2	0.0229	2	0.0233	2	0.0225	2
722	0.0225	2	0.0225	2	0.0225	2	0.0221	2	0.0221	2
723	0.0225	2	0.0225	2	0.0218	2	0.0225	2	0.0221	2
724	0.0233	2	0.0229	2	0.0233	2	0.0225	2	0.0225	2
725	0.0229	2	0.0233	2	0.0240	2	0.0225	2	0.0229	2
726	0.0229	2	0.0233	2	0.0225	2	0.0221	2	0.0221	2
727	0.0113	1	0.0240	2	0.0225	2	0.0233	2	0.0229	2
728	0.0229	2	0.0240	2	0.0229	2	0.0229	2	0.0233	2
752	0.0229	2	0.0240	2	0.0236	2	0.0229	2	0.0233	2
753	0.0116	1	n.s.	n.s.	0.0225	2	0.0221	2	0.0236	2
754	0.0113	1	0.0225	2	0.0225	2	0.0221	2	0.0240	2
755	0.0116	1	0.0120	1	0.0454	4	0.0446	4	0.0454	4
756	0.0225	2	0.0225	2	0.0206	2	0.0221	2	0.0229	2
757	0.0229	2	0.0221	2	0.0236	2	0.0214	2	0.0240	2
758	0.0225	2	0.0225	2	0.0225	2	0.0221	2	0.0225	2
759	0.0113	1	0.0225	2	0.0218	2	0.0221	2	0.0225	2
760	0.0229	2	0.0225	2	0.0214	2	0.0225	2	0.0229	2
761	0.0225	2	0.0229	2	0.0236	2	0.0221	2	0.0225	2
762	0.0225	2	0.0229	2	0.0225	2	0.0225	2	0.0218	2
763	n.s.	n.s.	n.s.	n.s.	0.0349	3	0.0330	3	0.0341	3
764	0.0116	1	n.s.	n.s.	0.0225	2	0.0225	2	0.0214	2
765	0.0225	2	0.0225	2	0.0225	2	0.0229	2	0.0221	2
766	0.0225	2	0.0225	2	0.0225	2	0.0225	2	0.0221	2
767	n.s.	n.s.	n.s.	n.s.	0.0233	2	0.0203	2	0.0218	2

Table 3.- Greenland halibut mean catch (kg) and SD by stratum. Spanish Spring Surveys in NAFO Div. 3NO: 2009-2013. n.s. means stratum not surveyed.

	2009		2010		2011		2012		2013	
Stratum	GHL Mean catch	GHL SD	GHL Mean catch	GHL SD	GHL Mean catch	GHL SD	GHL Mean catch	GHL SD	GHL Mean catch	GHL SD
353	0.05	0.05	0.04	0.06	0.78	0.82	0.36	0.46	2.81	2.97
354	0.00	0.00	0.80	0.03	0.08	0.14	0.30	0.40	0.13	0.10
355	0.03	0.04	5.16	3.73	2.44	2.73	0.73	0.79	0.14	0.02
356	0.00	0.00	3.41	0.37	1.48	0.37	0.14	0.20	0.30	0.32
357	1.65	0.61	1.77	0.76	0.18	0.14	0.13	0.10	0.03	0.05
358	0.02	0.03	8.23	11.44	0.27	0.38	0.00	0.00	0.12	0.20
359	0.00	0.00	0.19	0.40	0.06	0.09	0.06	0.13	0.03	0.09
360	0.01	0.04	0.03	0.10	0.00	0.02	0.00	0.00	0.01	0.06
374	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
375	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
376	0.08	0.25	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
377	0.07	0.02	0.01	0.02	0.01	0.02	0.00	0.00	0.00	0.00
378	0.01	0.02	1.11	1.56	0.04	0.03	0.00	0.00	0.00	0.00
379	0.27	0.38	0.55	0.01	2.26	3.07	4.56	3.48	0.58	0.19
380	1.41	0.84	2.55	2.42	4.53	1.00	3.30	1.12	7.63	2.97
381	0.10	0.08	0.10	0.08	0.68	0.02	0.01	0.01	0.00	0.00
382	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
721	16.01	20.92	6.98	7.84	17.80	7.87	3.90	1.20	3.17	4.45
722	11.33	4.70	44.80	24.75	22.12	2.07	33.38	39.30	18.30	11.34
723	7.59	8.88	7.22	7.34	7.03	9.68	7.77	3.40	6.35	8.79
724	25.68	21.18	31.31	7.62	13.85	2.19	14.99	8.91	6.90	6.60
725	3.10	0.28	11.31	8.34	5.73	1.14	6.16	0.70	1.97	0.04
726	213.22	217.46	37.45	9.40	20.33	2.87	25.33	1.22	10.86	0.71
727	3.98	-	72.69	37.82	26.29	10.16	37.78	33.12	40.56	41.80
728	32.95	2.33	110.47	78.81	47.33	20.05	18.77	10.28	15.20	9.79
752	130.95	130.18	60.80	15.98	24.10	9.75	21.96	3.59	16.91	1.92
753	45.10	-	n.s.	n.s.	26.57	0.33	27.90	10.89	13.27	8.84
754	113.10	-	65.35	30.48	20.90	17.82	23.42	1.29	31.42	38.45
755	27.60	-	46.40	-	15.09	11.23	14.12	7.50	12.21	2.12
756	18.85	0.92	128.97	50.45	23.30	13.44	33.86	31.11	16.18	17.45
757	58.22	21.90	48.32	7.19	12.38	2.71	46.23	41.68	34.86	34.14
758	61.75	3.18	72.30	48.93	10.83	3.92	27.56	4.78	32.55	7.49
759	140.08	-	66.95	33.02	18.27	14.47	22.09	7.76	32.81	7.57
760	40.03	21.60	54.30	23.48	30.50	33.38	32.07	11.36	28.03	4.24
761	44.27	20.46	54.64	37.72	36.28	12.86	33.38	18.63	15.12	6.07
762	53.85	9.40	68.15	55.65	41.67	8.44	14.68	7.16	7.17	2.84
763	n.s.	n.s.	n.s.	n.s.	17.93	11.36	27.47	17.71	9.49	1.43
764	17.34	-	n.s.	n.s.	32.86	11.57	35.52	16.26	23.92	13.70
765	53.06	29.47	31.62	15.62	14.02	6.51	20.79	0.51	11.97	8.99
766	10.42	1.01	26.37	9.84	15.10	8.37	25.59	22.44	15.75	18.84
767	n.s.	n.s.	n.s.	n.s.	18.02	19.18	4.42	1.73	7.21	7.64

Table 4.- Greenland halibut survey biomass (t) by stratum in NAFO Div. 3NO: 2009-2013. n.s. means stratum not surveyed.

Strata	2009	2010	2011	2012	2013
353	1	1	18	9	65
354	0	18	2	7	3
355	0	33	16	5	1
356	0	14	6	1	1
357	46	26	3	2	0
358	0	165	5	0	2
359	0	7	2	2	1
360	4	8	1	0	3
374	0	0	0	0	0
375	0	0	0	0	0
376	10	0	0	0	0
377	1	0	0	0	0
378	0	14	0	0	0
379	3	5	22	43	5
380	12	21	38	28	64
381	1	1	8	0	0
382	0	0	0	0	0
721	91	40	101	22	18
722	85	335	165	248	139
723	105	100	100	107	89
724	274	339	148	165	76

Strata	2009	2010	2011	2012	2013
725	28	102	50	57	18
726	1342	232	130	165	71
727	34	581	224	312	340
728	225	718	323	128	102
752	1500	664	267	252	191
753	535	0	326	348	155
754	1810	1046	334	381	471
755	914	1489	512	487	414
756	169	1158	228	309	143
757	519	445	107	441	296
758	543	636	95	247	286
759	1581	756	213	254	370
760	539	743	439	439	377
761	673	817	525	516	230
762	1015	1263	785	277	140
763	n.s.	0	403	652	218
764	149	0	292	307	224
765	585	348	154	225	134
766	133	337	193	327	205
767	n.s.	0	245	69	105

Table 5.- Greenland halibut survey biomass (t) with SD and stratified mean catch per tow (kg) and SD by in NAFO Div. 3NO: 1997-2013.

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005
Biomass	6859	11305	11246	9331	7721	2380	4701	3437	3071
SD	546	860	973	707	790	410	575	373	325
Biomass 5+	4303	6284	6367	8785	6700	2011	3386	2318	2585
Biomass 10+	406	504	660	1111	741	279	495	318	380
MCPT	7.73	11.73	12.00	9.48	8.17	2.64	5.10	3.68	3.39
SD	0.62	0.89	1.00	0.75	0.84	0.45	0.61	0.40	0.36

Year	2006	2007	2008	2009	2010	2011	2012	2013
Biomass	2720	3286	7272	12927	12462	6483	6830	4959
SD	379	363	708	1506	1197	593	631	606
Biomass 5+	2151	3057	6908	11971	12057	6091	6297	4697
Biomass 10+	182	343	798	1134	1158	1163	1587	1319
MCPT	3.03	3.98	7.66	14.78	14.80	7.09	7.37	5.46
SD	0.42	0.44	0.74	1.73	1.40	0.63	0.69	0.47

Table 6.- Greenland halibut length weight relationships in Spanish Spring Surveys in NAFO Div. 3NO: 2009-2013. E(x) means Error of the parameter x.

	Males						Females						Indet.					
	a	**b**	**E(a)**	**E(b)**	**R2**	**N**	**a**	**b**	**E(a)**	**E(b)**	**R2**	**N**	**a**	**b**	**E(a)**	**E(b)**	**R2**	**N**
2009	**0.00322**	**3.22204**	0.0963	0.027	0.999	273	**0.0039**	**3.1931**	0.1422	0.0384	0.989	382	**0.0037**	**3.2040**	0.1398	0.0379	0.988	662
2010	**0.00414**	**3.16630**	0.0927	0.0267	0.997	379	**0.0043**	**3.1713**	0.0802	0.0221	0.997	546	**0.0040**	**3.1909**	0.0705	0.0194	0.998	925
2011	**0.00540**	**3.09233**	0.1308	0.0378	0.993	516	**0.0029**	**3.2753**	0.0688	0.0186	0.998	871	**0.0033**	**3.2445**	0.0666	0.0185	0.998	1401
2012	**0.00566**	**3.08178**	0.0846	0.0236	0.999	441	**0.0034**	**3.2350**	0.1038	0.0277	0.998	865	**0.0037**	**3.2099**	0.0976	0.0267	0.998	1309
2013	**0.00474**	**3.11481**	0.0763	0.0218	0.998	364	**0.0038**	**3.2000**	0.0704	0.0191	0.998	737	**0.0054**	**3.1051**	0.1402	0.0385	0.99	1109

Table 7.- Greenland halibut mean number per tow by year in Spanish Spring Surveys in NAFO Div. 3NO: 1997-2013. Indet. means indeterminate.

	1997				1998				1999				2000				2001			
	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
MNPT	11.087	16.467	1.445	28.999	14.270	19.987	0.239	34.496	14.821	21.726	0.251	36.799	6.364	11.103	0.286	17.753	9.894	14.977	1.036	25.907

	2002				2003				2004				2005				2006			
	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
MNPT	3.262	4.718	0.111	8.092	5.077	8.101	0.111	13.288	6.738	8.459	0.087	15.284	3.381	5.359	0.012	8.752	3.683	4.765	0.007	8.455

	2007				2008				2009				2010				2011			
	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
MNPT	2.895	4.803	0.048	7.746	3.698	7.075	0.051	10.825	8.980	14.667	0.128	23.775	6.657	13.979	0.010	20.646	3.849	6.847	0.107	10.802

	2012				2013			
	Males	Females	Indet.	Total	Males	Females	Indet.	Total
MNPT	3.453	6.618	0.010	10.081	2.234	4.463	0.049	6.746

Table 8.- Greenland halibut mean number per tow by length class and year. Spanish Spring Survey in NAFO 3NO: 2009-2013. Indet. means indeterminate.

	2009				2010				2011				2012				2013			
Lenght (cm.)	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
6	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.005
8	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
10	0.037	0.053	0.089	0.179	0.029	0.053	0.000	0.082	0.018	0.010	0.034	0.061	0.000	0.000	0.000	0.000	0.013	0.013	0.016	0.041
12	0.174	0.102	0.039	0.315	0.078	0.091	0.005	0.175	0.220	0.195	0.042	0.458	0.000	0.030	0.010	0.040	0.101	0.071	0.028	0.200
14	0.149	0.087	0.000	0.237	0.047	0.062	0.005	0.114	0.455	0.773	0.031	1.259	0.018	0.019	0.000	0.036	0.017	0.014	0.000	0.031
16	0.000	0.014	0.000	0.014	0.011	0.035	0.000	0.046	0.121	0.275	0.000	0.396	0.004	0.003	0.000	0.007	0.048	0.058	0.000	0.106
18	0.335	0.314	0.000	0.649	0.094	0.089	0.000	0.183	0.013	0.064	0.000	0.077	0.017	0.026	0.000	0.043	0.056	0.099	0.000	0.155
20	0.656	1.228	0.000	1.885	0.515	0.469	0.000	0.984	0.101	0.112	0.000	0.213	0.058	0.075	0.000	0.133	0.057	0.066	0.000	0.122
22	0.663	0.589	0.000	1.251	0.329	0.496	0.000	0.825	0.261	0.261	0.000	0.522	0.139	0.241	0.000	0.380	0.053	0.058	0.000	0.111
24	0.274	0.331	0.000	0.605	0.256	0.427	0.000	0.683	0.191	0.255	0.000	0.446	0.348	0.526	0.000	0.874	0.026	0.033	0.000	0.058
26	0.293	0.296	0.000	0.589	0.090	0.215	0.000	0.306	0.117	0.146	0.000	0.263	0.358	0.625	0.000	0.983	0.005	0.000	0.000	0.005
28	0.628	0.437	0.000	1.066	0.083	0.075	0.000	0.157	0.052	0.086	0.000	0.138	0.222	0.284	0.000	0.506	0.063	0.035	0.000	0.098
30	0.343	0.511	0.000	0.854	0.137	0.211	0.000	0.348	0.100	0.174	0.000	0.275	0.084	0.083	0.000	0.167	0.086	0.136	0.000	0.222
32	0.457	0.492	0.000	0.948	0.228	0.236	0.000	0.464	0.166	0.147	0.000	0.313	0.126	0.106	0.000	0.232	0.111	0.228	0.000	0.339
34	0.507	0.294	0.000	0.801	0.256	0.287	0.000	0.543	0.109	0.150	0.000	0.259	0.112	0.163	0.000	0.275	0.123	0.252	0.000	0.374
36	0.293	0.241	0.000	0.534	0.405	0.456	0.000	0.861	0.104	0.106	0.000	0.210	0.195	0.146	0.000	0.341	0.124	0.138	0.000	0.262
38	0.358	0.274	0.000	0.632	0.526	0.749	0.000	1.276	0.156	0.214	0.000	0.370	0.152	0.326	0.000	0.478	0.146	0.278	0.000	0.424
40	0.528	0.722	0.000	1.250	0.551	1.271	0.000	1.822	0.176	0.271	0.000	0.447	0.232	0.393	0.000	0.625	0.137	0.174	0.000	0.311
42	0.571	0.906	0.000	1.477	0.595	1.427	0.000	2.022	0.226	0.375	0.000	0.601	0.253	0.417	0.000	0.670	0.149	0.379	0.000	0.528
44	0.629	1.109	0.000	1.738	0.439	1.505	0.000	1.944	0.172	0.402	0.000	0.574	0.240	0.450	0.000	0.690	0.098	0.359	0.000	0.457
46	0.487	1.484	0.000	1.971	0.497	1.133	0.000	1.630	0.291	0.338	0.000	0.629	0.239	0.368	0.000	0.607	0.166	0.364	0.000	0.530
48	0.494	1.409	0.000	1.902	0.643	1.057	0.000	1.700	0.257	0.457	0.000	0.714	0.228	0.388	0.000	0.616	0.152	0.285	0.000	0.437
50	0.496	1.308	0.000	1.804	0.472	1.040	0.000	1.512	0.196	0.468	0.000	0.664	0.144	0.326	0.000	0.470	0.107	0.205	0.000	0.312
52	0.268	1.023	0.000	1.291	0.149	0.828	0.000	0.978	0.134	0.399	0.000	0.534	0.121	0.298	0.000	0.419	0.156	0.243	0.000	0.399
54	0.149	0.466	0.000	0.614	0.122	0.587	0.000	0.709	0.100	0.324	0.000	0.424	0.067	0.304	0.000	0.371	0.093	0.223	0.000	0.317
56	0.078	0.376	0.000	0.455	0.076	0.402	0.000	0.478	0.055	0.227	0.000	0.282	0.063	0.241	0.000	0.304	0.071	0.139	0.000	0.210
58	0.076	0.202	0.000	0.278	0.021	0.334	0.000	0.356	0.046	0.181	0.000	0.228	0.018	0.219	0.000	0.237	0.038	0.079	0.000	0.116
60	0.029	0.120	0.000	0.149	0.006	0.169	0.000	0.176	0.006	0.165	0.000	0.171	0.015	0.187	0.000	0.202	0.023	0.156	0.000	0.179
62	0.000	0.052	0.000	0.052	0.000	0.088	0.000	0.088	0.000	0.099	0.000	0.099	0.000	0.116	0.000	0.116	0.017	0.130	0.000	0.146
64	0.009	0.052	0.000	0.061	0.000	0.083	0.000	0.083	0.000	0.051	0.000	0.051	0.000	0.064	0.000	0.064	0.000	0.072	0.000	0.072
66	0.000	0.042	0.000	0.042	0.000	0.034	0.000	0.034	0.006	0.017	0.000	0.023	0.000	0.025	0.000	0.025	0.000	0.049	0.000	0.049
68	0.000	0.012	0.000	0.012	0.000	0.016	0.000	0.016	0.000	0.012	0.000	0.012	0.000	0.033	0.000	0.033	0.000	0.030	0.000	0.030
70	0.000	0.007	0.000	0.007	0.000	0.026	0.000	0.026	0.000	0.005	0.000	0.005	0.000	0.025	0.000	0.025	0.000	0.015	0.000	0.015
72	0.000	0.000	0.000	0.000	0.000	0.006	0.000	0.006	0.000	0.010	0.000	0.010	0.000	0.041	0.000	0.041	0.000	0.022	0.000	0.022
74	0.000	0.079	0.000	0.079	0.000	0.006	0.000	0.006	0.000	0.005	0.000	0.005	0.000	0.025	0.000	0.025	0.000	0.025	0.000	0.025
76	0.000	0.011	0.000	0.011	0.000	0.000	0.000	0.000	0.000	0.026	0.000	0.026	0.000	0.021	0.000	0.021	0.000	0.006	0.000	0.006
78	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.021	0.000	0.021	0.000	0.005	0.000	0.005	0.000	0.000	0.000	0.000
80	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.000	0.008	0.000	0.000	0.000	0.000	0.000	0.024	0.000	0.024
82	0.000	0.024	0.000	0.024	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
84	0.000	0.000	0.000	0.000	0.000	0.007	0.000	0.007	0.000	0.000	0.000	0.000	0.000	0.016	0.000	0.016	0.000	0.000	0.000	0.000
86	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.009	0.000	0.009	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
88	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.008	0.000	0.008	0.000	0.005	0.000	0.005	0.000	0.000	0.000	0.000
90	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.006	0.000	0.006
92	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
94	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.005	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
96	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
98	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
100	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
102	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
104	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	8.980	14.667	0.128	23.775	6.657	13.979	0.010	20.646	3.849	6.847	0.107	10.802	3.453	6.618	0.010	10.081	2.234	4.463	0.049	6.746
Nº samples:				57				63				77				67				67
Nº Ind.:	702	1296	11	2009	994	2045	2	3041	701	1211	15	1927	549	1073	2	1624	378	756	8	1142
Sampled catch:				1424				2062				1082				1149				857
Range:				10-83				10-94				10-89				12-89				7-90
Total catch:				1918				2095				1112				1197				885
Total hauls:				109				95				122				122				122

Table 9.- Greenland halibut mean number per tow by age, sex and year. Spanish Spring Survey in NAFO 3NO: 2009-2013. Indet. means indeterminate.

	2009				2010				2011				2012				2013			
Age	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
0																				
1	0.36	0.21	0.13	0.70	0.16	0.20	0.01	0.37	0.81	1.28	0.11	2.20	0.02	0.05	0.01	0.08	0.13	0.09	0.05	0.27
2	1.53	1.69		3.22	1.02	1.18		2.21	0.60	0.70		1.30	0.65	1.15		1.80	0.20	0.26		0.45
3	0.97	1.25		2.21	0.32	0.62		0.94	0.19	0.29		0.48	0.63	0.71		1.34	0.09	0.14		0.23
4	1.17	1.45		2.61	0.35	0.38		0.73	0.27	0.34		0.62	0.17	0.27		0.44	0.24	0.57		0.81
5	1.62	1.11		2.73	1.62	1.80		3.42	0.38	0.56		0.95	0.47	0.62		1.09	0.40	0.78		1.17
6	1.73	3.21		4.94	1.29	4.29		5.58	0.94	1.07		2.01	0.55	1.16		1.71	0.46	1.01		1.48
7	1.32	4.35		5.67	1.59	3.56		5.16	0.53	1.60		2.12	0.77	1.23		2.00	0.55	0.67		1.22
8	0.12	0.73		0.85	0.24	0.99		1.23	0.08	0.35		0.43	0.13	0.41		0.54	0.07	0.26		0.33
9	0.06	0.30		0.35	0.03	0.36		0.39	0.03	0.20		0.22	0.03	0.37		0.40	0.06	0.15		0.21
10	0.08	0.11		0.19	0.03	0.23		0.26	0.00	0.23		0.24	0.03	0.31		0.34	0.02	0.22		0.24
11	0.04	0.10		0.14		0.24		0.24	0.00	0.05		0.05		0.11		0.11	0.01	0.13		0.13
12		0.03		0.03		0.04		0.04	0.01	0.05		0.06		0.05		0.05		0.09		0.09
13		0.02		0.02		0.02		0.02		0.02		0.02		0.06		0.06		0.03		0.03
14		0.01		0.01		0.03		0.03		0.06		0.06		0.05		0.05		0.04		0.04
15		0.08		0.08		0.02		0.02		0.01		0.01		0.01		0.01		0.01		0.01
16		0.02		0.02						0.02		0.02		0.03		0.03		0.02		0.02
17										0.01		0.01		0.02		0.02		0.01		0.01
18						0.01		0.01						0.01		0.01		0.01		0.01
19																				
20																				
Total	8.98	14.67	0.13	23.78	6.66	13.98	0.01	20.65	3.85	6.85	0.11	10.80	3.45	6.62	0.01	10.08	2.23	4.46	0.05	6.75

Table 10.- Greenland halibut mean length (cm) per tow by age, sex and year. Spanish Spring Survey in NAFO 3NO: 2009-2013. Indet. means indeterminate.

	2009				2010				2011				2012				2013			
Age	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
0																				
1	13.49	12.98	11.82	13.03	13.26	12.91	14.00	13.09	14.65	15.16	13.17	14.88	15.14	14.30	13.50	14.41	13.13	12.88	12.06	12.85
2	21.47	21.23		21.34	22.06	22.56		22.33	23.46	23.44		23.45	24.91	25.23		25.12	19.77	19.69		19.73
3	26.24	24.56		25.29	25.18	25.03		25.08	29.13	29.26		29.21	28.30	27.61		27.94	27.00	27.13		27.08
4	31.73	32.01		31.89	31.97	31.97		31.97	32.87	33.09		32.99	33.83	34.15		34.02	32.39	33.72		33.33
5	38.53	38.96		38.70	38.49	38.55		38.52	38.60	39.62		39.21	38.41	39.21		38.87	37.55	40.07		39.21
6	44.86	44.70		44.76	44.03	43.93		43.96	45.54	44.62		45.05	43.29	43.64		43.52	44.02	45.49		45.03
7	49.80	50.20		50.10	48.89	49.20		49.10	51.33	51.33		51.33	49.03	49.50		49.32	51.04	51.26		51.16
8	53.30	55.15		54.90	54.07	54.76		54.62	56.53	54.66		55.02	54.63	55.18		55.05	56.36	55.64		55.80
9	57.12	58.17		58.00	56.15	56.84		56.79	56.78	58.14		57.97	57.28	57.15		57.16	58.34	56.39		56.95
10	58.50	61.05		60.03	58.30	59.79		59.63	61.50	61.16		61.17	58.40	60.38		60.21	61.14	61.68		61.63
11	62.43	63.66		63.32		62.40		62.40	61.50	63.34		63.29		63.57		63.57	63.50	63.69		63.68
12		67.16		67.16		65.39		65.39	67.50	65.30		65.54		66.62		66.62		65.43		65.43
13		66.86		66.86		67.40		67.40		63.40		63.40		68.66		68.66		71.23		71.23
14		72.77		72.77		72.72		72.72		75.62		75.62		72.80		72.80		71.72		71.72
15		75.57		75.57		76.19		76.19		77.38		77.38		72.50		72.50		74.50		74.50
16		83.50		83.50						85.57		85.57		75.50		75.50		80.98		80.98
17										86.50		86.50		84.50		84.50		81.50		81.50
18						94.50		94.50						89.50		89.50		90.50		90.50
19																				
20																				
Total	35.89	41.16	11.82	39.01	38.67	43.07	14.00	41.64	34.36	39.15	13.17	37.18	37.75	42.30	13.50	40.71	39.73	44.60	12.06	42.75

Table 11.- Greenland halibut mean weight (g) per tow by age, sex and year. Spanish Spring Survey in NAFO 3NO: 2009-2013. Indet. means indeterminate.

	2009				2010				2011				2012				2013			
Age	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
0																				
1	14	13	10	13	15	15	18	15	22	22	15	22	25	20	16	20	15	14	13	14
2	64	66		65	76	87		82	95	91		93	117	119		118	53	55		54
3	123	109		115	116	122		120	187	189		188	173	159		165	140	156		150
4	225	250		239	242	257		250	268	280		275	293	311		304	241	298		281
5	429	477		449	440	470		456	441	504		479	434	487		465	383	520		473
6	689	731		716	670	711		702	739	744		742	626	689		669	626	775		728
7	961	1063		1040	935	1020		994	1063	1179		1150	925	1036		993	991	1133		1069
8	1191	1441		1407	1277	1423		1394	1422	1444		1439	1288	1461		1420	1341	1471		1443
9	1474	1705		1667	1436	1594		1583	1439	1753		1715	1483	1640		1627	1490	1529		1518
10	1590	1994		1833	1615	1870		1842	1838	2071		2067	1583	1958		1925	1724	2039		2009
11	1966	2284		2197		2142		2142	1838	2322		2309		2313		2313	1938	2266		2243
12		2713		2713		2488		2488	2451	2567		2555		2702		2702		2471		2471
13		2674		2674		2727		2727		2327		2327		2976		2976		3256		3256
14		3524		3524		3470		3470		4167		4167		3603		3603		3315		3315
15		3976		3976		4112		4112		4465		4465		3523		3523		3721		3721
16		5498		5498						6252		6252		4032		4032		4861		4861
17										6426		6426		5782		5782		4960		4960
18						7955		7955						6963		6963		6935		6935
19																				
20																				
Total	452	734	10	624	551	796	18	717	465	774	15	657	509	841	16	726	587	930	13	810

able 12.- American plaice mean catch (kg) and SD by stratum. Spanish Spring Surveys in NAFO Div. 3NO: 2009-2013. n.s. means stratum not surveyed.

	2009		2010		2011		2012		2013	
Stratum	A. Plaice Mean catch	A. Plaice SD	A. Plaice Mean catch	A. Plaice SD	A. Plaice Mean catch	A. Plaice SD	A. Plaice Mean catch	A. Plaice SD	A. Plaice Mean catch	A. Plaice SD
353	124.75	50.32	76.65	23.69	176.17	63.06	48.19	31.32	216.48	132.63
354	96.97	70.61	91.98	96.36	32.62	22.35	68.89	70.27	58.79	54.85
355	13.40	1.70	8.31	7.37	28.07	12.97	9.62	9.50	10.40	3.41
356	1.19	1.68	0.00	0.00	0.00	0.00	0.51	0.72	1.08	1.53
357	0.80	1.13	1.43	1.37	0.02	0.03	0.00	0.00	0.00	0.00
358	21.82	15.03	16.08	2.09	8.95	5.54	3.15	4.42	26.27	43.04
359	446.02	401.64	270.83	295.54	95.47	71.95	127.72	171.24	142.43	119.20
360	174.64	109.38	307.45	267.99	474.90	575.54	399.52	491.34	479.42	490.74
374	136.26	21.01	150.65	21.99	813.15	131.17	547.80	380.00	952.66	561.92
375	132.23	107.01	89.90	54.31	150.59	82.35	59.42	28.10	65.63	66.77
376	87.85	85.74	83.39	80.95	62.48	86.03	34.36	33.89	47.28	32.12
377	487.92	674.13	199.40	52.61	119.65	57.20	366.11	68.67	149.80	66.76
378	78.74	72.92	123.25	139.94	20.06	25.51	2.93	2.73	3.77	5.33
379	10.85	15.34	0.00	0.00	0.29	0.40	0.00	0.00	0.00	0.00
380	9.50	6.65	372.20	419.03	8.46	3.17	8.95	12.66	1.81	1.56
381	3.85	0.50	13.08	11.07	71.75	9.40	152.70	206.76	123.28	95.78
382	0.63	0.82	102.97	138.92	98.66	90.80	480.11	214.81	90.53	61.16
721	0.60	0.85	0.00	0.00	0.23	0.32	0.00	0.00	0.02	0.03
722	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
723	0.17	0.24	0.01	0.02	0.00	0.00	0.11	0.15	0.00	0.00
724	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
725	0.66	0.93	0.18	0.23	0.00	0.00	0.00	0.00	0.00	0.00
726	51.30	72.55	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
727	547.30	-	59.95	13.36	0.69	0.22	34.82	47.76	0.00	0.00
728	246.60	306.32	0.00	0.00	0.00	0.00	1.30	1.84	0.00	0.00
752	0.05	0.06	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
753	0.00	-	n.s.	n.s.	0.00	0.00	0.00	0.00	0.00	0.00
754	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
755	0.00	-	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00
756	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
757	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
758	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
759	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
760	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
761	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
762	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
763	n.s.	n.s.	n.s.	n.s.	0.00	0.00	0.00	0.00	0.00	0.00
764	0.00	-	n.s.	n.s.	0.00	0.00	0.00	0.00	0.00	0.00
765	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
766	0.19	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
767	n.s.	n.s.	n.s.	n.s.	0.00	0.00	0.00	0.00	0.00	0.00

Table 13.- American plaice survey biomass (t) by stratum in NAFO Div. 3NO: 2009-2013. n.s. means stratum not surveyed.

Strata	2009	2010	2011	2012	2013
353	2918	1833	4077	1152	5009
354	2120	2011	698	1506	1286
355	85	54	179	62	68
356	5	0	0	2	5
357	23	21	0	0	0
358	432	322	175	65	525
359	16345	9704	3489	4668	5065
360	42774	73604	111356	94879	113616
374	2592	2866	15468	10250	17537
375	3150	2009	3401	1385	1482
376	10349	9888	7078	3880	5317
377	4337	1715	1029	3201	1268
378	957	1523	232	36	47
379	101	0	3	0	0
380	80	3025	71	75	15
381	48	154	889	1988	1457
382	19	3038	3008	14517	2567
721	3	0	1	0	0
722	0	0	0	0	0
723	2	0	0	1	0
724	0	0	0	0	0

Strata	2009	2010	2011	2012	2013
725	6	2	0	0	0
726	323	0	0	0	0
727	4670	480	6	288	0
728	1682	0	0	9	0
752	1	0	0	0	0
753	0	n.s.	0	0	0
754	0	0	0	0	0
755	0	0	0	0	0
756	0	0	0	0	0
757	0	0	0	0	0
758	0	0	0	0	0
759	0	0	0	0	0
760	0	0	0	0	0
761	0	0	0	0	0
762	0	0	0	0	0
763	n.s.	n.s.	0	0	0
764	0	n.s.	0	0	0
765	0	0	0	0	0
766	2	0	0	0	0
767	n.s.	n.s.	0	0	0

Table 14.- American plaice survey biomass (t) with SD and stratified mean catch per tow (kg) and SD by in NAFO Div. 3NO: 1997-2013.

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005
Biomass	21827	64635	110010	152997	101137	69511	116842	129432	123227
SD	4495	5946	5825	16740	10841	7097	9777	12335	11396
MCPT	25.80	72.25	128.72	175.49	115.95	77.77	127.17	143.93	138.77
SD	5.09	6.51	6.85	19.24	12.31	7.46	10.79	13.03	12.92

Year	2006	2007	2008	2009	2010	2011	2012	2013
Biomass	170910	112086	172735	93025	112247	151160	137964	155264
SD	24806	13032	17696	10258	18089	29753	27395	29284
MCPT	202.84	141.82	193.67	106.59	134.33	172.05	155.11	176.26
SD	29.01	15.31	20.39	11.31	22.27	34.95	30.53	31.60

Table 15.- American plaice length weight relationships in Spanish Spring Surveys in NAFO Div. 3NO: 2009-2013. E(x) means Error of the parameter x.

	Males						Females						Indet.					
	a	**b**	**E(a)**	**E(b)**	**R2**	**N**	**a**	**b**	**E(a)**	**E(b)**	**R2**	**N**	**a**	**b**	**E(a)**	**E(b)**	**R2**	**N**
2009	**0.00537**	**3.10820**	0.0842	0.0261	0.997	305	**0.0027**	**3.3232**	0.069	0.0191	0.997	559	**0.0048**	**3.1692**	0.1173	0.0337	0.99	876
2010	**0.00270**	**3.32315**	0.1264	0.0398	0.995	382	**0.0027**	**3.3332**	0.1016	0.0287	0.996	695	**0.0033**	**3.2755**	0.0545	0.0156	0.999	1091
2011	**0.00469**	**3.15597**	0.0919	0.0276	0.997	557	**0.0036**	**3.2453**	0.0637	0.0181	0.998	1038	**0.0039**	**3.2285**	0.0613	0.0176	0.998	1597
2012	**0.00525**	**3.13031**	0.1089	0.0323	0.998	426	**0.0039**	**3.2240**	0.0907	0.025	0.999	715	**0.0043**	**3.1992**	0.0889	0.0243	0.999	1141
2013	**0.01096**	**2.91169**	0.2717	0.0846	0.972	609	**0.0059**	**3.1190**	0.1705	0.0477	0.987	987	**0.0079**	**3.0398**	0.1175	0.0342	0.992	1695

Table 16.- American plaice mean number per tow by year in Spanish Spring Surveys in NAFO Div. 3NO: 1997-2013. Indet. means indeterminate.

	1997				1998				1999				2000				2001			
	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
MNPT	40.511	38.798	0.023	79.332	56.883	108.124	0.000	165.008	122.141	183.012	10.273	315.426	222.117	359.467	0.348	581.933	252.254	261.936	5.053	519.242

	2002				2003				2004				2005				2006			
	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
MNPT	149.083	175.044	0.319	324.447	245.522	236.752	0.407	482.682	206.765	241.817	64.714	513.296	279.087	280.604	2.603	562.294	443.600	423.144	0.191	866.936

	2007				2008				2009				2010				2011			
	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
MNPT	249.539	242.885	3.602	496.025	351.426	361.373	12.541	725.340	134.548	186.163	4.328	325.039	281.719	234.732	0.195	516.645	385.477	286.713	0.010	672.200

	2012				2013			
	Males	Females	Indet.	Total	Males	Females	Indet.	Total
MNPT	350.620	246.778	0.684	598.083	376.247	261.170	3.239	640.655

Table 17.- American plaice mean number per tow by length class and year. Spanish Spring Survey in NAFO 3NO: 2009-2013. Indet. means indeterminate.

	2009				2010				2011				2012				2013			
Lenght (cm.)	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
2	0.000	0.000	0.017	0.017	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
4	0.000	0.000	0.084	0.084	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.253	0.253
6	0.009	0.009	1.252	1.269	0.020	0.007	0.195	0.221	0.000	0.000	0.000	0.000	0.000	0.000	0.079	0.079	0.144	0.011	1.490	1.645
8	0.323	0.255	1.828	2.406	0.040	0.106	0.000	0.146	0.000	0.078	0.000	0.078	0.000	0.000	0.135	0.135	0.031	0.000	0.652	0.683
10	0.624	0.443	0.831	1.899	5.652	5.813	0.000	11.465	0.063	0.066	0.000	0.128	0.064	0.016	0.277	0.357	0.044	0.030	0.127	0.200
12	1.056	0.761	0.151	1.968	13.825	12.833	0.000	26.658	0.195	0.220	0.000	0.415	0.038	0.033	0.194	0.265	0.100	0.125	0.041	0.267
14	3.309	2.975	0.097	6.380	9.208	9.087	0.000	18.295	3.230	1.081	0.010	4.321	0.037	0.332	0.000	0.369	0.110	0.436	0.326	0.873
16	6.313	7.598	0.068	13.978	5.606	5.537	0.000	11.142	15.370	10.447	0.000	25.816	0.379	0.496	0.000	0.875	0.385	1.038	0.337	1.760
18	3.348	4.013	0.000	7.361	10.834	9.345	0.000	20.179	18.082	20.344	0.000	38.426	3.398	1.464	0.000	4.863	1.082	0.556	0.011	1.648
20	2.673	2.552	0.000	5.225	16.893	14.650	0.000	31.543	15.116	10.105	0.000	25.222	16.317	12.092	0.000	28.409	3.729	2.642	0.000	6.371
22	5.638	3.474	0.000	9.112	15.894	10.922	0.000	26.817	24.201	10.896	0.000	35.098	30.991	21.311	0.000	52.301	17.122	8.493	0.000	25.615
24	13.784	5.481	0.000	19.265	24.252	9.510	0.000	33.762	41.480	24.442	0.000	65.922	34.632	20.584	0.000	55.215	50.459	26.073	0.000	76.533
26	23.336	12.973	0.000	36.309	40.883	7.316	0.000	48.199	51.597	23.269	0.000	74.867	54.164	22.669	0.000	76.833	70.033	34.461	0.000	104.494
28	21.745	23.534	0.000	45.279	56.452	16.059	0.000	72.511	75.074	14.248	0.000	89.322	74.377	30.164	0.000	104.542	75.578	25.543	0.000	101.121
30	17.699	24.519	0.000	42.217	39.702	24.479	0.000	64.181	69.544	17.391	0.000	86.935	64.827	20.397	0.000	85.224	77.589	27.953	0.000	105.542
32	13.522	15.402	0.000	28.924	25.227	25.449	0.000	50.677	39.504	31.733	0.000	71.236	40.060	21.282	0.000	61.342	43.729	26.620	0.000	70.349
34	11.775	8.900	0.000	20.675	11.550	20.411	0.000	31.961	20.299	39.746	0.000	60.045	20.386	23.807	0.000	44.192	26.539	23.731	0.000	50.270
36	5.686	8.568	0.000	14.254	3.882	10.721	0.000	14.603	8.914	26.537	0.000	35.451	7.540	25.102	0.000	32.642	5.972	23.152	0.000	29.124
38	2.408	11.090	0.000	13.498	1.226	8.739	0.000	9.965	1.757	14.690	0.000	16.447	2.028	15.882	0.000	17.910	2.891	22.206	0.000	25.097
40	0.838	15.607	0.000	16.445	0.395	9.650	0.000	10.046	0.875	10.742	0.000	11.616	0.960	8.640	0.000	9.601	0.615	13.225	0.000	13.839
42	0.306	13.462	0.000	13.768	0.081	8.885	0.000	8.965	0.077	10.603	0.000	10.679	0.209	7.553	0.000	7.762	0.050	8.535	0.000	8.585
44	0.034	9.311	0.000	9.346	0.000	7.461	0.000	7.461	0.000	7.054	0.000	7.054	0.114	4.944	0.000	5.058	0.000	6.836	0.000	6.836
46	0.031	4.344	0.000	4.376	0.047	4.639	0.000	4.686	0.092	4.441	0.000	4.533	0.000	3.619	0.000	3.619	0.022	3.599	0.000	3.622
48	0.027	2.823	0.000	2.850	0.044	2.760	0.000	2.804	0.000	2.439	0.000	2.439	0.039	2.431	0.000	2.470	0.000	2.020	0.000	2.020
50	0.037	1.730	0.000	1.768	0.000	2.054	0.000	2.054	0.007	1.475	0.000	1.482	0.012	1.191	0.000	1.203	0.023	1.427	0.000	1.450
52	0.027	1.477	0.000	1.504	0.000	2.767	0.000	2.767	0.000	1.232	0.000	1.232	0.049	1.035	0.000	1.084	0.000	0.444	0.000	0.444
54	0.000	1.421	0.000	1.421	0.000	1.539	0.000	1.539	0.000	0.637	0.000	0.637	0.000	0.585	0.000	0.585	0.000	0.282	0.000	0.282
56	0.000	1.246	0.000	1.246	0.000	1.358	0.000	1.358	0.000	0.856	0.000	0.856	0.000	0.626	0.000	0.626	0.000	0.305	0.000	0.305
58	0.000	0.855	0.000	0.855	0.007	1.021	0.000	1.028	0.000	0.926	0.000	0.926	0.000	0.121	0.000	0.121	0.000	0.584	0.000	0.584
60	0.000	0.745	0.000	0.745	0.000	0.580	0.000	0.580	0.000	0.469	0.000	0.469	0.000	0.266	0.000	0.266	0.000	0.233	0.000	0.233
62	0.000	0.262	0.000	0.262	0.000	0.520	0.000	0.520	0.000	0.341	0.000	0.341	0.000	0.088	0.000	0.088	0.000	0.292	0.000	0.292
64	0.000	0.256	0.000	0.256	0.000	0.473	0.000	0.473	0.000	0.146	0.000	0.146	0.000	0.026	0.000	0.026	0.000	0.188	0.000	0.188
66	0.000	0.070	0.000	0.070	0.000	0.000	0.000	0.000	0.000	0.035	0.000	0.035	0.000	0.021	0.000	0.021	0.000	0.094	0.000	0.094
68	0.000	0.006	0.000	0.006	0.000	0.000	0.000	0.000	0.000	0.025	0.000	0.025	0.000	0.000	0.000	0.000	0.000	0.011	0.000	0.011
70	0.000	0.000	0.000	0.000	0.000	0.008	0.000	0.008	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.019	0.000	0.019
72	0.000	0.000	0.000	0.000	0.000	0.012	0.000	0.012	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.005	0.000	0.005
74	0.000	0.000	0.000	0.000	0.000	0.019	0.000	0.019	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
76	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
Total	134.548	186.163	4.328	325.039	281.719	234.732	0.195	516.645	385.477	286.713	0.010	672.200	350.620	246.778	0.684	598.083	376.247	261.170	3.239	640.655
Nº samples:				76				57				70				67				66
Nº Ind.:	4571	6451	263	11285	3817	5613	12	9442	5295	7616	1	12912	4712	5894	37	10643	6627	7310	98	14035
Sampled catch:				3964				2795				3668				3067				4027
Range:				3-69				6-74				8-69				6-67				5-72
Total catch:				11219				9215				14415				13937				14575
Total hauls:				109				95				122				122				122

Table 18.- American plaice mean number per tow by age, sex and year. Spanish Spring Survey in NAFO 3NO: 2009-2013. Indet. means indeterminate.

	2009				2010				2011				2012				2013			
Age	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
1	0.04	0.26	2.30	2.61	0.01	0.11	0.19	0.32		0.08		0.08			0.68	0.68	0.08	0.01	2.44	2.52
2	1.87	0.67	1.01	3.55	21.82	20.14		41.96	4.51	1.91	0.00	6.42	0.11	0.21		0.32	0.33	0.24	0.15	0.72
3	14.41	15.56	1.01	30.98	10.92	17.21		28.13	46.51	37.72	0.01	84.24	2.02	1.94		3.96	0.16	0.63	0.28	1.07
4	2.42	4.30	0.01	6.74	38.74	29.11		67.85	45.42	25.50		70.92	33.17	25.18		58.35	7.69	4.16	0.30	12.15
5	31.55	18.96		50.51	29.59	13.91		43.50	77.52	39.25		116.78	47.78	23.62		71.40	94.09	38.48	0.07	132.64
6	40.02	57.15		97.16	81.49	27.39		108.88	103.49	33.67		137.16	114.42	53.55		167.96	104.24	56.26	0.00	160.50
7	16.48	18.60		35.08	73.32	67.68		141.00	75.62	52.47		128.10	84.64	40.56		125.20	124.59	58.25		182.84
8	12.25	7.40		19.65	17.64	12.07		29.71	24.96	57.45		82.41	50.29	34.16		84.46	34.41	30.40		64.82
9	7.33	9.84		17.17	5.61	8.05		13.66	6.20	8.63		14.83	12.38	37.15		49.52	8.83	33.12		41.94
10	5.88	17.25		23.13	1.62	7.94		9.56	1.10	8.87		9.97	5.20	12.44		17.64	0.97	20.80		21.77
11	1.91	18.63		20.54	0.75	8.69		9.44	0.13	8.63		8.76	0.37	6.61		6.98	0.84	7.33		8.17
12	0.23	7.79		8.02	0.11	11.00		11.11	0.00	6.35		6.36	0.07	5.03		5.10	0.02	5.21		5.23
13	0.10	1.40		1.50	0.09	3.41		3.50		2.18		2.18	0.05	2.62		2.67		2.62		2.62
14	0.02	1.09		1.11	0.00	1.34		1.34		0.90		0.90	0.08	1.58		1.65		1.31		1.31
15	0.02	2.29		2.31		1.39		1.39		0.35		0.35	0.05	0.34		0.39		0.61		0.61
16	0.03	1.92		1.95		2.58		2.58		0.76		0.76		0.79		0.79		0.52		0.52
17		1.62		1.62		1.55		1.55		0.91		0.91		0.64		0.64		0.32		0.32
18		0.86		0.86		0.52		0.52		0.29		0.29		0.20		0.20		0.48		0.48
19		0.37		0.37		0.49		0.49		0.56		0.56		0.07		0.07		0.13		0.13
20		0.20		0.20		0.01		0.01		0.16		0.16		0.08		0.08		0.11		0.11
21				0.00				0.00						0.01		0.01		0.19		0.19
22								0.00		0.07		0.07								
23						0.15		0.15												
Total	134.5	186.2	4.328	325	281.7	234.7	0.195	516.6	385.5	286.7	0.01	672.2	350.6	246.8	0.684	598.1	376.2	261.2	3.239	640.7

Table 19.- American plaice mean length (cm) per tow by age, sex and year. Spanish Spring Survey in NAFO 3NO: 2009-2013. Indet. means indeterminate.

	2009				2010				2011				2012				2013			
Age	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
1	8.81	8.93	7.87	7.99	7.66	8.88	7.00	7.69		9.00		9.00			10.71	10.71	7.10	7.00	7.43	7.42
2	12.60	13.37	9.58	11.89	13.24	13.12		13.18	16.16	16.05	15.00	16.13	12.41	14.46		13.73	13.45	16.24	15.77	14.86
3	18.12	17.55	11.40	17.61	16.21	17.19		16.81	19.57	20.49	15.00	19.98	20.59	20.82		20.70	13.64	16.90	13.65	15.56
4	21.12	21.49	13.78	21.34	21.23	21.69		21.43	24.41	22.72		23.80	23.24	23.29		23.26	23.29	21.93	16.07	22.65
5	27.04	27.33		27.15	24.70	24.59		24.67	27.08	26.82		26.99	26.19	25.91		26.10	26.45	25.89	17.22	26.28
6	28.23	30.61		29.63	28.65	29.79		28.94	29.31	30.66		29.64	27.82	27.07		27.59	28.56	28.50	19.00	28.54
7	31.41	33.60		32.57	30.12	33.14		31.57	31.87	34.16		32.81	30.30	31.66		30.74	30.42	31.48		30.76
8	34.91	36.27		35.42	32.90	37.02		34.57	34.11	36.67		35.89	32.38	34.76		33.34	34.17	35.81		34.94
9	35.04	40.47		38.15	34.42	39.21		37.24	34.78	40.27		37.97	34.37	37.58		36.77	33.87	38.23		37.31
10	33.37	42.26		40.00	37.12	43.52		42.44	39.28	43.59		43.11	34.85	40.62		38.92	39.71	40.47		40.43
11	35.65	42.54		41.90	36.90	43.61		43.08	41.35	44.11		44.07	40.03	43.88		43.68	37.87	42.59		42.10
12	40.24	45.40		45.25	41.65	45.67		45.63	51.00	46.54		46.55	44.34	45.68		45.66	46.87	45.49		45.49
13	44.37	49.62		49.28	45.53	46.45		46.42		50.62		50.62	46.62	47.75		47.73		47.20		47.20
14	45.00	54.34		54.20	59.00	53.81		53.81		51.91		51.91	50.04	50.68		50.65		51.41		51.41
15	45.00	47.41		47.39		54.31		54.31		55.65		55.65	46.62	54.39		53.43		51.84		51.84
16	49.00	54.05		53.98		55.63		55.63		56.43		56.43		55.48		55.48		56.22		56.22
17		58.50		58.50		60.22		60.22		58.78		58.78		55.95		55.95		59.56		59.56
18		59.13		59.13		58.48		58.48		60.50		60.50		61.40		61.40		59.79		59.79
19		52.45		52.45		56.86		56.86		61.07		61.07		61.80		61.80		59.91		59.91
20		65.71		65.71		75.00		75.00		63.13		63.13		58.31		58.31		63.62		63.62
21														65.00		65.00		64.97		64.97
22										63.00		63.00								
23						59.00		59.00												
Total	28.26	34	9.103	31.29	26.38	30.64	7	28.31	27.89	31.8	15	29.56	28.74	32.05	10.71	30.08	29.21	32.97	9.369	30.64

Table 20.- American plaice mean weight (g) per tow by age, sex and year. Spanish Spring Survey in NAFO 3NO: 2009-2013. Indet. means indeterminate.

	2009				2010				2011				2012				2013			
Age	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total	Males	Females	Indet.	Total
1	5	4	4	4	2	4	2	3		5		5			9	9	3	3	4	4
2	16	16	7	13	16	15		16	31	31	24	31	15	22		19	27	37	37	32
3	49	40	12	43	32	41		38	59	71	24	64	68	70		69	22	45	23	36
4	76	76	20	76	76	84		79	116	100		111	102	104		103	107	95	37	101
5	159	166		161	121	127		123	161	165		162	152	147		151	154	155	45	154
6	178	241		215	194	234		204	204	252		216	181	170		178	194	210	61	200
7	249	329		292	228	324		274	265	354		301	234	275		247	234	289		251
8	339	421		370	302	475		373	326	445		409	286	377		323	323	425		371
9	347	602		493	354	571		482	349	597		494	347	474		443	318	519		477
10	303	687		590	449	794		736	513	767		739	357	608		534	498	618		612
11	383	712		682	452	806		778	596	808		805	551	778		766	437	730		700
12	531	885		874	660	946		943	1148	956		956	756	887		885	820	889		889
13	743	1171		1143	914	1008		1005		1254		1254	883	1015		1012		990		990
14	739	1582		1569	2072	1601		1602		1362		1362	1117	1237		1231		1306		1306
15	739	1061		1058		1650		1650		1707		1707	883	1541		1460		1358		1358
16	963	1562		1554		1822		1822		1768		1768		1653		1653		1732		1732
17		2032		2032		2348		2348		2033		2033		1696		1696		2067		2067
18		2088		2088		2135		2135		2227		2227		2275		2275		2079		2079
19		1472		1472		1983		1983		2296		2296		2320		2320		2104		2104
20		2951		2951		4806		4806		2546		2546		1947		1947		2498		2498
21														2728		2728		2668		2668
22										2517		2517								
23						2160		2160												
Total	198	430	6	328	171	368	2	260	189	348	24	257	206	334	9	259	211	370	11	275

Table 21.- Atlantic cod mean catch (kg) and SD by stratum. Spanish Spring Surveys in NAFO Div. 3NO: 2009-2013. n.s. means stratum not surveyed.

	2009		2010		2011		2012		2013	
Stratum	Cod Mean catch	Cod SD	Cod Mean catch	Cod SD	Cod Mean catch	Cod SD	Cod Mean catch	Cod SD	Cod Mean catch	Cod SD
353	0.00	0.00	0.00	0.00	10.99	9.95	15.47	26.79	23.85	27.59
354	25.17	21.16	12.41	0.58	12.26	12.01	6.40	11.09	14.17	21.04
355	3.63	4.45	17.89	15.20	14.17	3.22	9.13	1.77	1.01	1.42
356	2.94	3.59	4.98	7.04	5.19	2.14	3.48	0.39	0.00	0.00
357	14.29	15.29	28.52	31.31	8.33	11.78	5.80	1.13	4.96	1.96
358	50.33	41.80	78.96	86.77	35.08	43.03	19.26	21.03	164.20	153.12
359	520.11	821.11	850.41	1569.07	357.90	431.22	793.65	1704.52	92.73	108.90
360	162.21	719.97	6.17	9.10	355.05	1005.53	75.23	291.00	48.81	64.30
374	0.00	0.00	0.00	0.00	754.30	636.11	106.60	133.22	8.27	11.70
375	0.00	0.00	0.86	1.50	62.03	5.59	55.99	50.30	15.22	24.10
376	0.67	0.92	1.35	2.78	4.92	10.03	1.72	3.33	11.71	21.15
377	11.89	16.57	13.30	18.81	460.46	585.70	759.15	371.58	684.24	249.87
378	709.31	0.27	3328.75	3276.80	76.89	57.01	21.83	20.40	67.71	72.25
379	54.61	74.09	38.85	28.92	17.25	12.46	2.99	4.23	4.73	2.28
380	4.11	1.73	61.05	53.25	29.15	24.68	374.96	523.02	0.00	0.00
381	0.02	0.03	1.65	1.00	51.35	57.91	435.15	80.26	214.50	97.86
382	0.00	0.00	3.13	0.79	567.93	1113.89	666.47	483.49	274.53	160.99
721	1.00	1.41	0.00	0.00	0.00	0.00	5.00	1.13	0.00	0.00
722	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
723	17.29	8.64	0.00	0.00	5.18	7.33	4.42	2.66	3.81	0.22
724	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
725	2.19	3.09	11.62	16.43	1.65	2.33	2.59	3.66	0.00	0.00
726	1.38	1.94	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
727	5.01	-	1.32	0.77	0.00	0.00	0.00	0.00	0.00	0.00
728	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
752	0.25	0.35	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
753	0.00	-	n.s.	n.s.	0.00	0.00	0.00	0.00	0.00	0.00
754	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
755	0.00	-	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00
756	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
757	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
758	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
759	0.00	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
760	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
761	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
762	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
763	n.s.	n.s.	n.s.	n.s.	0.00	0.00	0.00	0.00	0.00	0.00
764	0.00	-	n.s.	n.s.	0.00	0.00	0.00	0.00	0.00	0.00
765	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
766	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
767	n.s.	n.s.	n.s.	n.s.	0.00	0.00	0.00	0.00	0.00	0.00

Table 22.- Atlantic cod survey biomass (t) by stratum in NAFO Div. 3NO: 2009-2013. n.s. means stratum not surveyed.

Strata	2009	2010	2011	2012	2013	Strata	2009	2010	2011	2012	2013
353	0	0	254	370	552	**725**	20	105	14	24	0
354	550	271	262	140	310	**726**	9	0	0	0	0
355	23	116	90	59	7	**727**	43	11	0	0	0
356	12	21	21	15	0	**728**	0	0	0	0	0
357	403	416	121	83	69	**752**	3	0	0	0	0
358	996	1579	686	394	3284	**753**	0	n.s.	0	0	0
359	21377	30470	13082	29009	3297	**754**	0	0	0	0	0
360	39731	1477	83252	17866	11568	**755**	0	0	0	0	0
374	0	0	14348	1995	152	**756**	0	0	0	0	0
375	0	19	1401	1305	344	**757**	0	0	0	0	0
376	79	160	558	194	1317	**758**	0	0	0	0	0
377	106	114	3961	6637	5792	**759**	0	0	0	0	0
378	8620	41129	891	265	837	**760**	0	0	0	0	0
379	506	360	165	28	42	**761**	0	0	0	0	0
380	34	496	245	3147	0	**762**	0	0	0	0	0
381	0	19	636	5664	2534	**763**	n.s.	n.s.	0	0	0
382	0	92	17315	20152	7786	**764**	0	n.s.	0	0	0
721	6	0	0	28	0	**765**	0	0	0	0	0
722	0	0	0	0	0	**766**	0	0	0	0	0
723	238	0	74	61	53	**767**	n.s.	n.s.	0	0	0
724	0	0	0	0	0						

Table 23.- Atlantic cod survey biomass (t) with SD and stratified mean catch per tow (kg) and SD by in NAFO Div. 3NO: 1997-2013.

Year	1997	1998	1999	2000	2001	2002	2003	2004	2005
Biomass	2131	19444	3054	7576	32548	10502	5455	3712	4509
SD	1322	18206	655	2566	15903	7971	3016	848	1984
MCPT	2.50	19.47	3.50	8.46	36.96	11.07	5.93	4.09	5.06
SD	1.54	17.82	0.75	2.58	17.97	7.82	3.29	0.95	2.16

Year	2006	2007	2008	2009	2010	2011	2012	2013
Biomass	19921	10592	23817	72757	76856	137378	87436	37945
SD	8109	5853	5221	40466	37369	54393	30292	5114
MCPT	23.35	13.47	26.55	80.73	90.96	155.16	97.02	43.33
SD	9.39	7.44	5.71	46.81	43.41	64.42	32.90	5.90

Table 24.- Atlantic cod length weight relationships in Spanish Spring Surveys in NAFO Div. 3NO: 2009-2013. E(x) means Error of the parameter x.

	a	b	E(a)	E(b)	R2	N
2009	**0.00516**	**3.09370**	0.0833	0.022	0.996	795
2010	**0.00507**	**3.12153**	0.0533	0.0137	0.998	1007
2011	**0.00471**	**3.13897**	0.0594	0.015	0.998	1541
2012	**0.00571**	**3.09345**	0.1091	0.0273	0.994	768
2013	**0.00586**	**3.09132**	0.067	0.017	0.997	1853

Table 25.- Atlantic cod mean number per tow by year in Spanish Spring Surveys in NAFO Div. 3NO: 1997-2013. Indet. means indeterminate.

	1997	1998	1999	2000	2001	2002	2003	2004	2005
MNPT	1.997	12.378	8.847	9.220	41.290	12.930	4.684	9.035	9.005

	2006	2007	2008	2009	2010	2011	2012	2013
MNPT	40.718	32.605	49.717	131.444	118.451	139.982	79.685	26.421

Table 26.- Atlantic cod mean number per tow by length class and year. Spanish Spring Survey in NAFO 3NO: 2009-2013.

	2009	2010	2011	2012	2013
Lenght (cm.)	Total	Total	Total	Total	Total
6	0.000	0.000	0.000	0.000	0.000
8	0.000	0.020	0.000	0.000	0.014
10	0.009	0.095	0.026	0.000	0.000
12	0.111	0.248	0.026	0.012	0.143
14	0.132	0.321	0.013	0.037	0.165
16	0.190	0.098	0.026	0.049	0.217
18	0.055	0.082	0.000	0.024	0.089
20	0.225	0.023	0.025	0.012	0.055
22	0.448	0.067	0.060	0.034	0.020
24	0.847	0.241	0.110	0.019	0.054
26	2.145	0.672	0.167	0.059	0.081
28	5.742	1.469	0.240	0.089	0.119
30	12.908	1.661	0.118	0.264	0.175
32	19.091	1.894	0.732	0.555	0.256
34	15.295	4.813	2.015	0.801	0.322
36	16.078	12.069	3.541	1.047	0.407
38	8.529	15.752	5.037	2.665	0.858
40	4.828	23.565	5.450	4.911	1.195
42	2.320	18.257	7.059	6.423	1.493
44	2.777	10.659	16.735	6.058	1.789
46	4.296	7.370	20.782	5.256	1.765
48	3.909	2.918	19.274	7.065	1.749
50	7.314	1.642	17.802	7.811	1.664
52	3.843	1.028	12.962	7.273	1.770
54	3.711	2.065	7.130	7.583	1.686
56	5.611	1.682	4.865	6.798	1.522
58	3.879	2.262	3.304	5.188	1.583
60	2.342	1.679	1.725	3.408	1.340
62	2.164	1.158	2.314	1.889	1.226
64	0.701	0.659	1.340	1.106	0.809
66	0.459	0.523	1.239	0.639	0.706
68	0.867	0.881	1.276	0.612	0.446
70	0.123	0.635	1.359	0.492	0.272
72	0.129	0.496	0.745	0.208	0.369
74	0.129	0.123	0.345	0.352	0.251
76	0.060	0.373	0.388	0.249	0.174
78	0.011	0.136	0.373	0.145	0.161
80	0.029	0.129	0.313	0.063	0.198
82	0.077	0.065	0.283	0.055	0.133
84	0.015	0.115	0.173	0.059	0.194
86	0.019	0.106	0.136	0.054	0.143
88	0.013	0.183	0.114	0.063	0.126
90	0.008	0.050	0.090	0.091	0.110
92	0.000	0.000	0.039	0.060	0.114
94	0.000	0.043	0.072	0.012	0.087
96	0.000	0.016	0.026	0.021	0.084
98	0.000	0.000	0.025	0.036	0.061
100	0.008	0.013	0.013	0.000	0.092
102	0.000	0.020	0.013	0.020	0.050
104	0.000	0.020	0.000	0.005	0.039
106	0.000	0.020	0.013	0.000	0.000
108	0.000	0.000	0.000	0.000	0.005
110	0.000	0.000	0.013	0.008	0.027
112	0.000	0.020	0.000	0.000	0.000
114	0.000	0.020	0.043	0.000	0.000
116	0.000	0.000	0.013	0.000	0.000
118	0.000	0.000	0.000	0.000	0.000
120	0.000	0.000	0.000	0.000	0.014
122	0.000	0.000	0.000	0.000	0.000
124	0.000	0.000	0.000	0.000	0.000
126	0.000	0.000	0.000	0.000	0.000
128	0.000	0.000	0.000	0.000	0.000
130	0.000	0.000	0.000	0.000	0.000
132	0.000	0.000	0.000	0.000	0.000
Total	131.444	118.451	139.982	79.685	26.421
Nº samples:	55	40	64	57	57
Nº Ind.:	2746	1814	5197	5107	3571
Sampled catch:	1417	1875	6381	6371	5251
Range:	11-100	9-114	10-116	13-110	9-120
Total catch:	9165	12406	15136	13497	5434
Total hauls:	109	95	122	122	122

Table 27.- Atlantic cod mean number per tow by age and year. Spanish Spring Survey in NAFO 3NO: 2009-2013.

Age	2009	2010	2011	2012	2013
1	0.38	0.84	0.16	0.14	0.67
2	1.40	3.92	1.04	0.58	0.46
3	75.62	8.24	17.25	9.74	1.86
4	12.52	88.96	13.57	19.04	7.13
5	28.43	4.02	92.17	4.81	4.20
6	11.77	7.65	3.00	38.65	1.06
7	1.04	4.30	8.98	4.19	9.26
8	0.17	0.12	3.38	1.86	0.23
9	0.02	0.23	0.22	0.55	0.91
10	0.02	0.02	0.02	0.06	0.58
11	0.02		0.04	0.04	0.05
12	0.04	0.12	0.09	0.01	0.00
13	0.01	0.02	0.06	0.02	
14			0.01	0.01	0.01
15					
16					
17					
18					
19					
20					
Total	131.44	118.45	139.98	79.69	26.42

Table 28.- Atlantic cod mean length (cm) per tow by age and year. Spanish Spring Survey in NAFO 3NO: 2009-2013.

Age	2009	2010	2011	2012	2013
1	14.99	14.26	30.18	16.90	16.10
2	24.11	29.75	40.31	31.15	28.64
3	34.26	36.73	46.63	40.56	38.43
4	38.48	41.70	49.70	46.22	46.44
5	52.09	50.43	56.02	53.15	51.81
6	58.90	60.59	64.34	54.56	53.11
7	61.82	67.50	71.67	56.10	61.16
8	69.55	74.96	84.98	70.19	71.43
9	85.91	85.55	88.82	80.76	84.43
10	86.22	105.50	95.87	80.63	93.60
11	85.70		99.54	96.45	92.49
12	86.58	102.88	109.24	89.50	109.50
13	81.50	97.45	95.50	99.19	
14				104.50	110.50
15					
16					
17					
18					
19					
20					
Total	40.87	43.42	49.80	51.21	53.77

Table 29.- Atlantic cod mean weight (g) per tow by age and year. Spanish Spring Survey in NAFO 3NO: 2009-2013.

Age	2009	2010	2011	2012	2013
1	23	22	45	38	34
2	102	207	215	247	194
3	300	398	532	553	479
4	427	593	830	833	865
5	1087	1072	1024	1277	1211
6	1594	1911	1488	1397	1359
7	1840	2759	2382	1516	2046
8	2668	3728	3273	3073	3417
9	5016	5557	5515	4748	5454
10	5037	10478	6153	4803	7531
11	4941		8549	7888	7143
12	5189	9980	8967	6229	11820
13	4217	8196	12108	8630	
14			7724	10059	12157
15					
16					
17					
18					
19					
20					
Total	614	768	1108	1218	1640

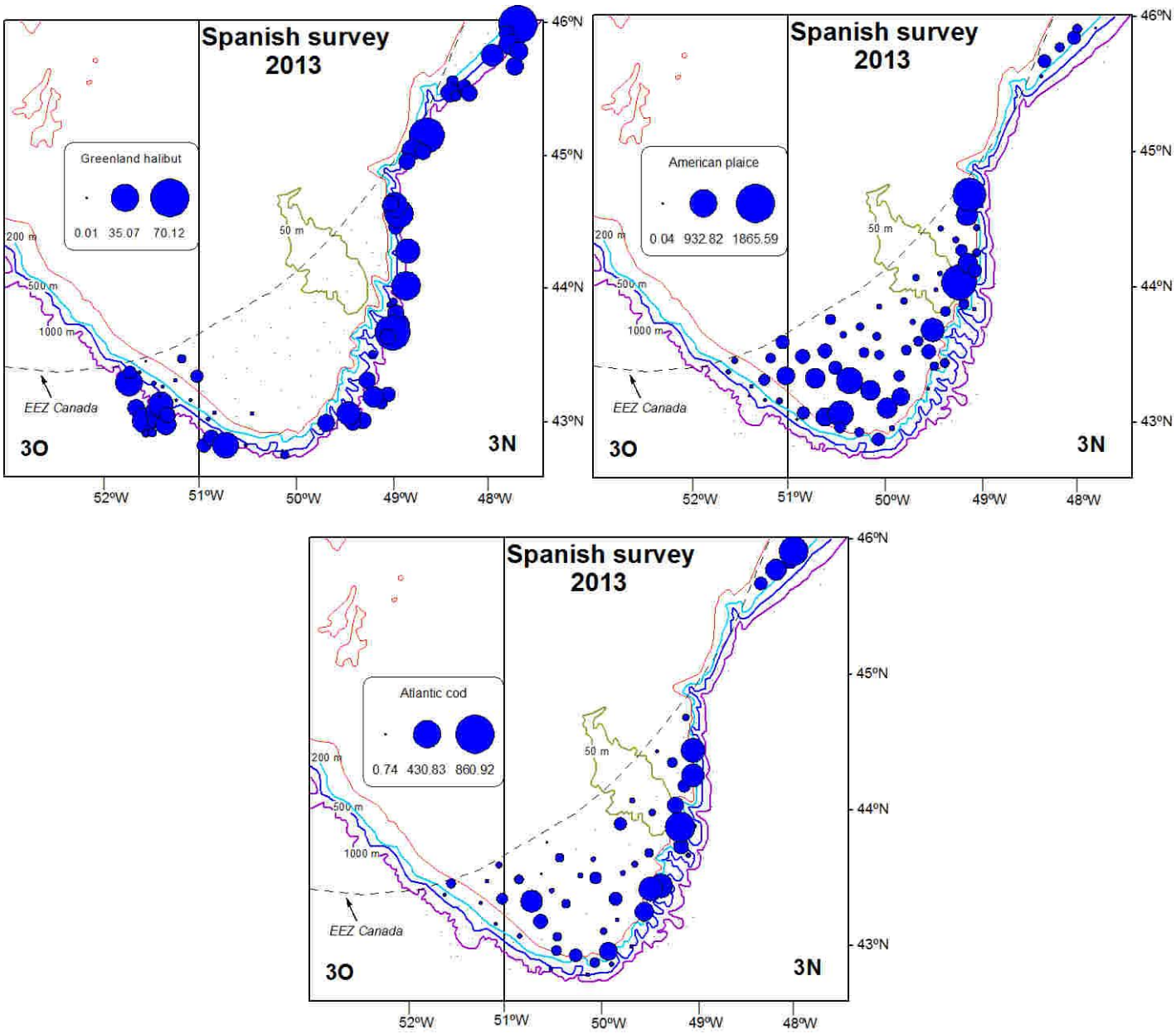

Figure 1.- Position of the hauls and the catch of Greenland halibut, American plaice and Atlantic cod during the 2013 Spanish 3NO survey. Note that the scale is different in the three graphs.

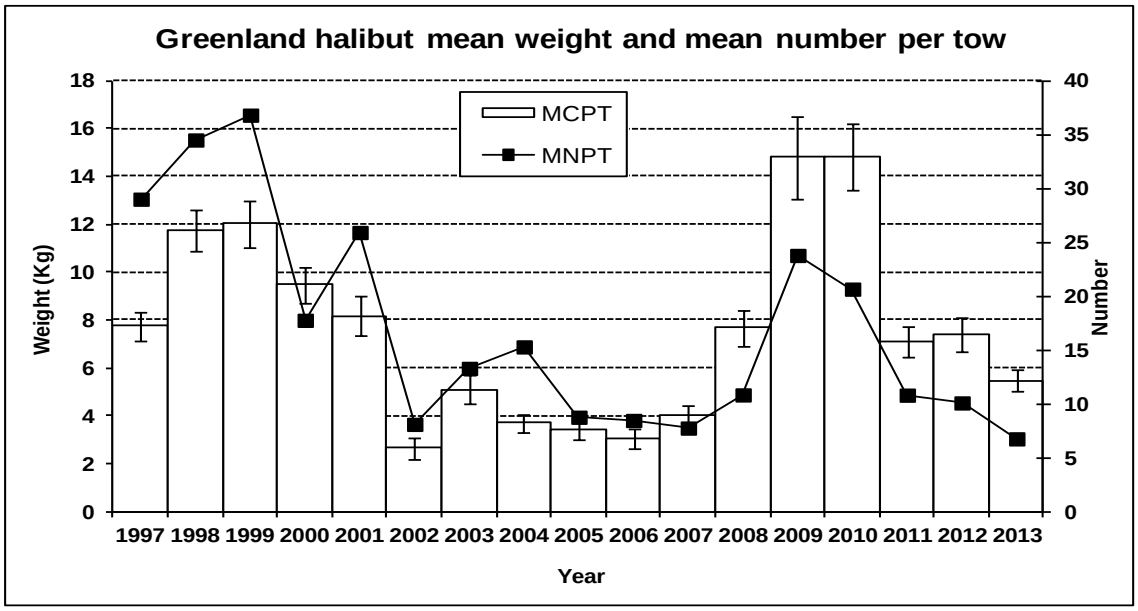

Figure 2.- Greenland halibut stratified mean catches in Kg and ±SD by year and mean number by year. Spanish Spring surveys in NAFO Div. 3NO: 1997-2013.

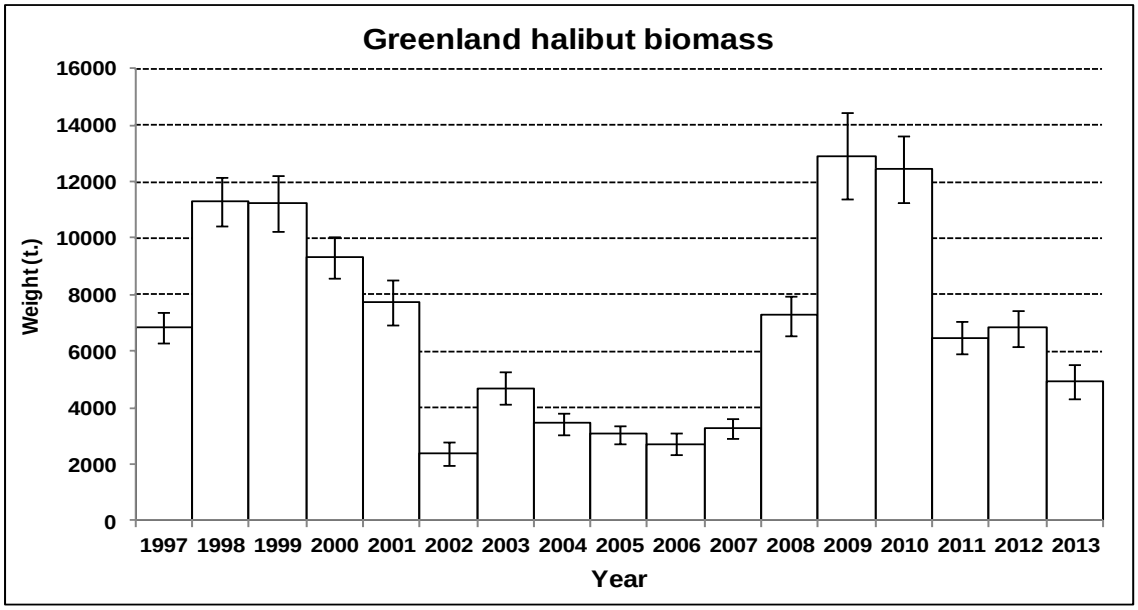

Figure 3.- Greenland halibut biomass calculated by the swept area method in tons and ±SD by year. Spanish Spring surveys in NAFO Div. 3NO: 1997-2013.

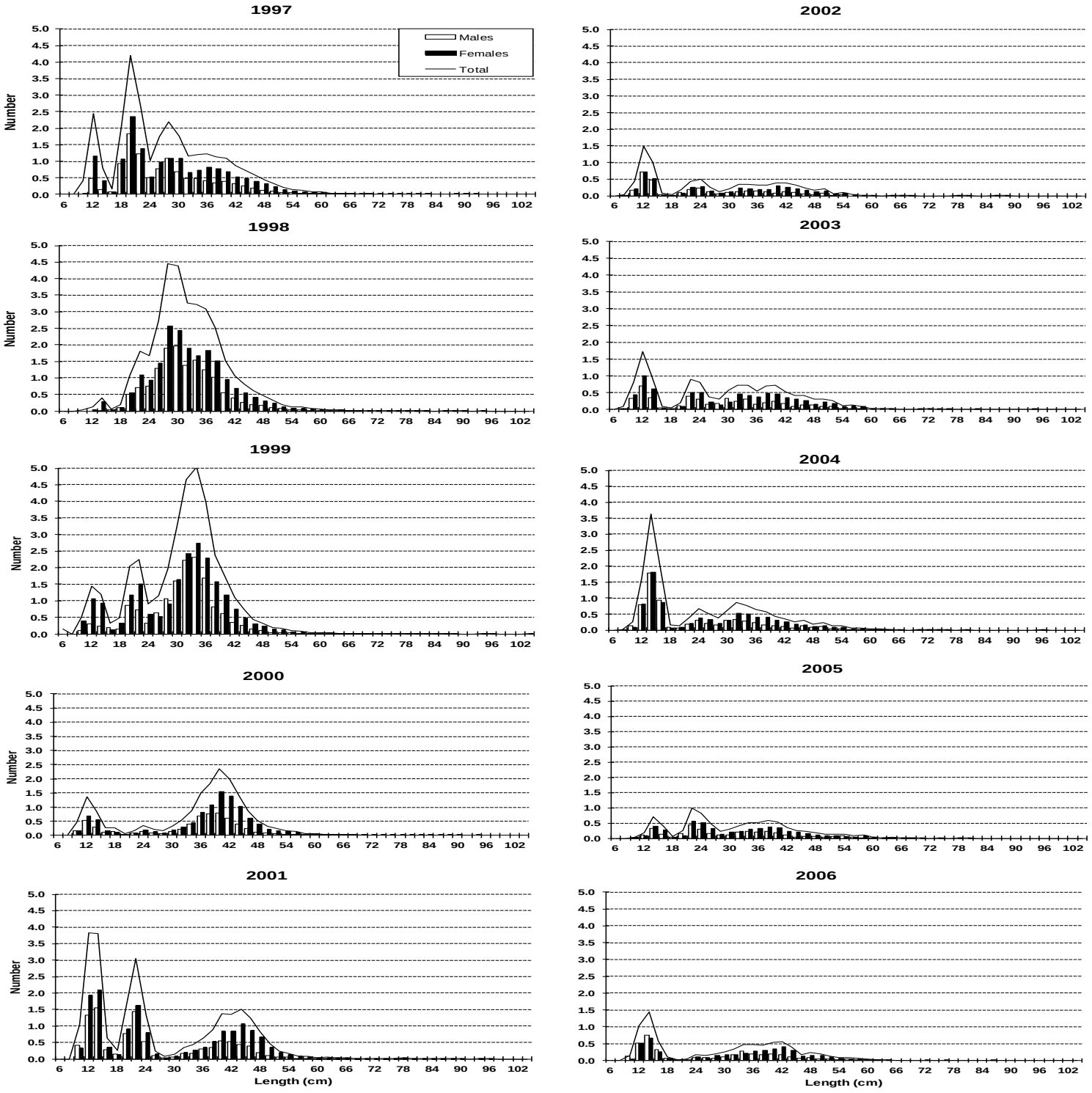

Figure 4.- Greenland halibut length distribution (cm) on NAFO 3NO: 1997-2013. Mean catches per tow number. Data from 2009 to 2013 are in Table 8; data for 1997-2008 can be seen in SCR Doc 13/10.

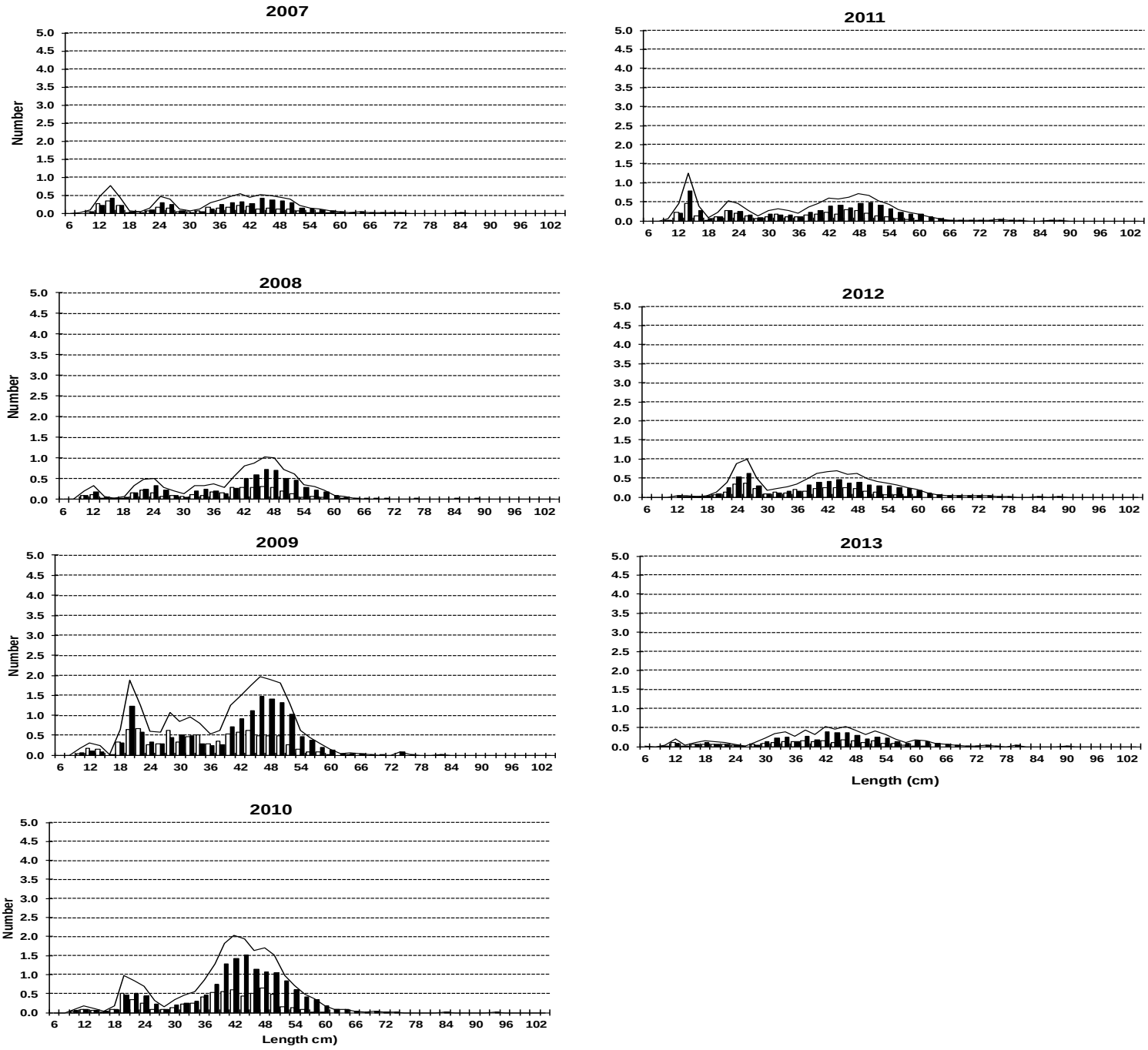

Figure 4 (cont.).- Greenland halibut length distribution (cm) on NAFO 3NO: 1997-2013. Mean catches per tow number. Data from 2009 to 2013 are in Table 8; data for 1997-2008 can be seen in SCR Doc 13/10.

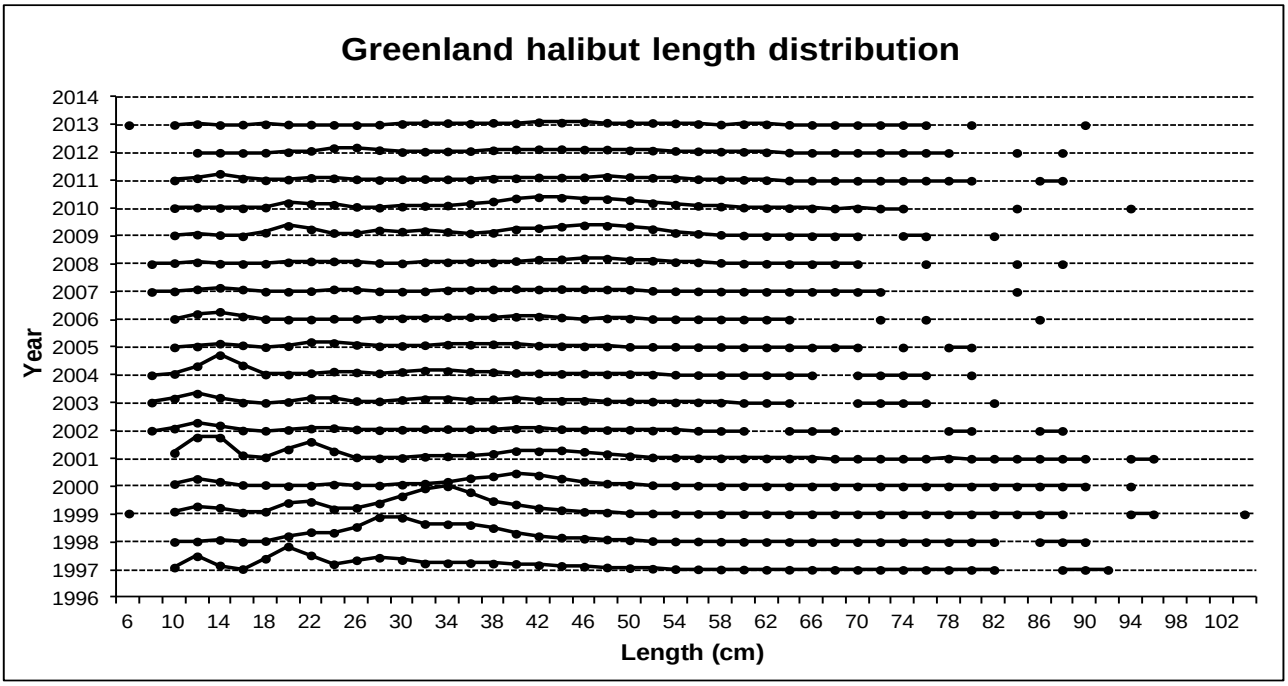

Figure 5.- Greenland halibut mean number per tow by length (cm) on NAFO 3NO: 1997-2013. Data from 2009 to 2013 are in Table 8; data for 1997-2008 can be seen in SCR Doc 13/10.

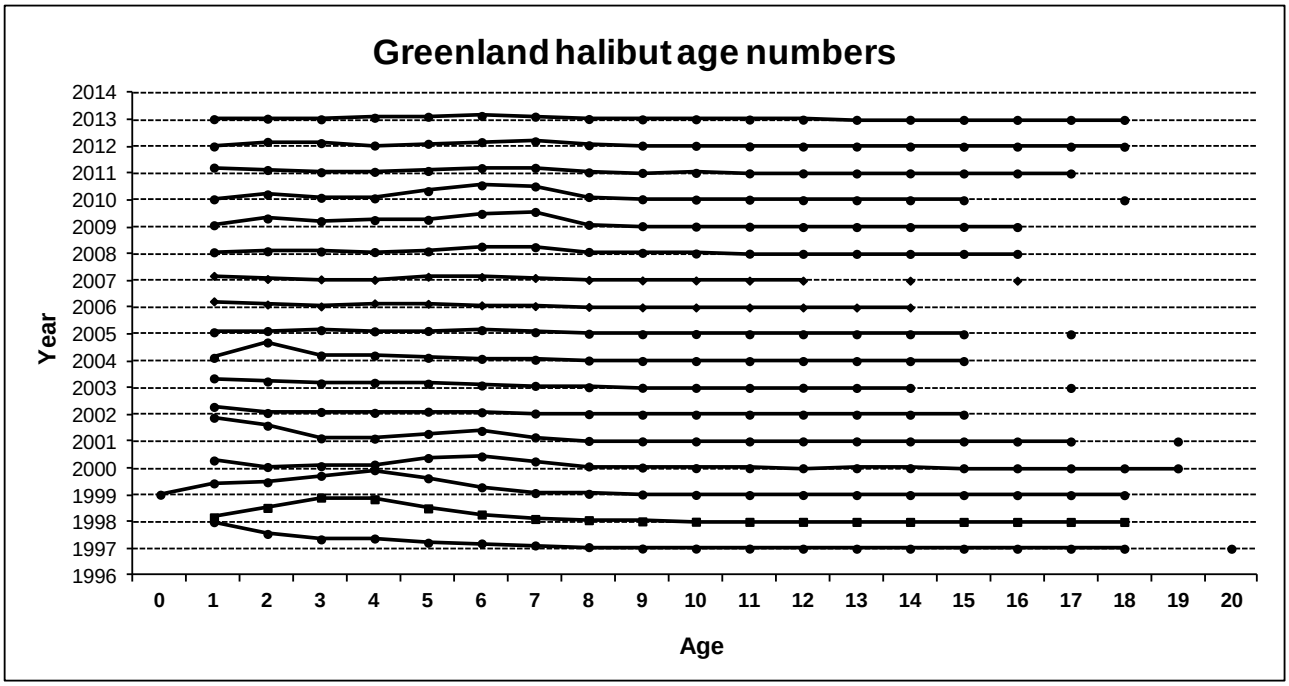

Figure 6.- Greenland halibut mean numbers per tow by age on NAFO 3NO: 1997-2013. Data from 2009 to 2013 are in Table 9; data for 1997-2008 can be seen in SCR Doc 13/10.

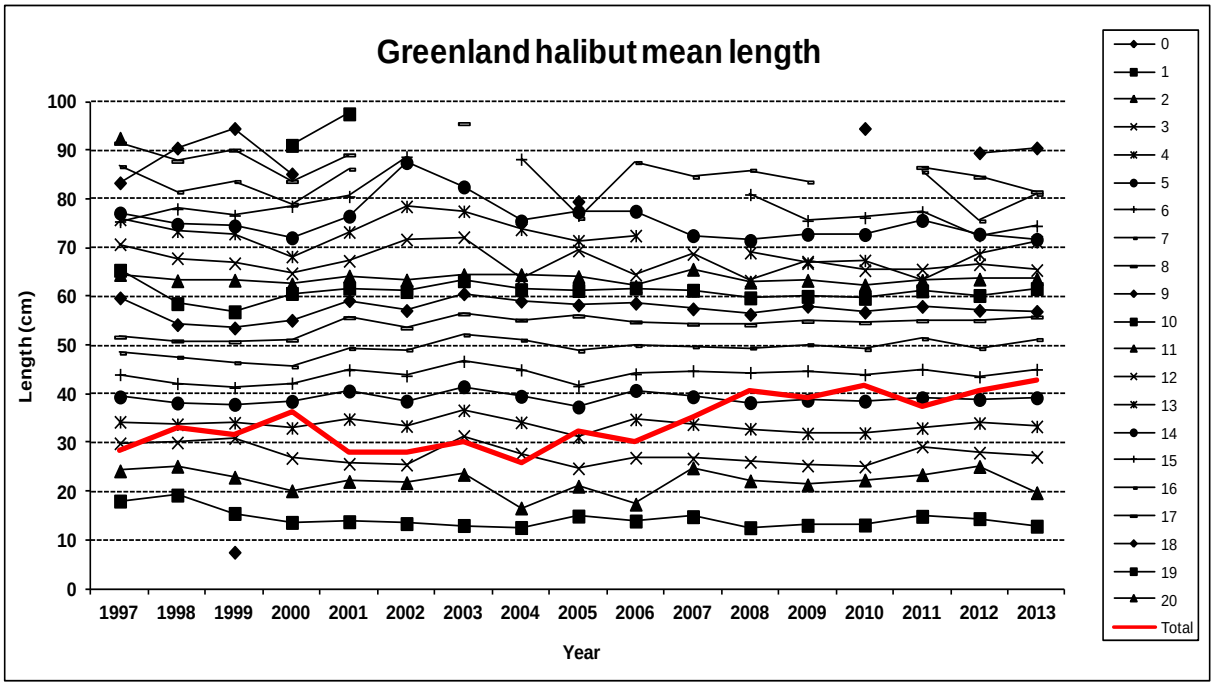

Figure 7.- Greenland halibut mean length (cm) at age on NAFO 3NO: 1997-2013. Data from 2009 to 2013 are in Table 10; data for 1997-2008 can be seen in SCR Doc 13/10.

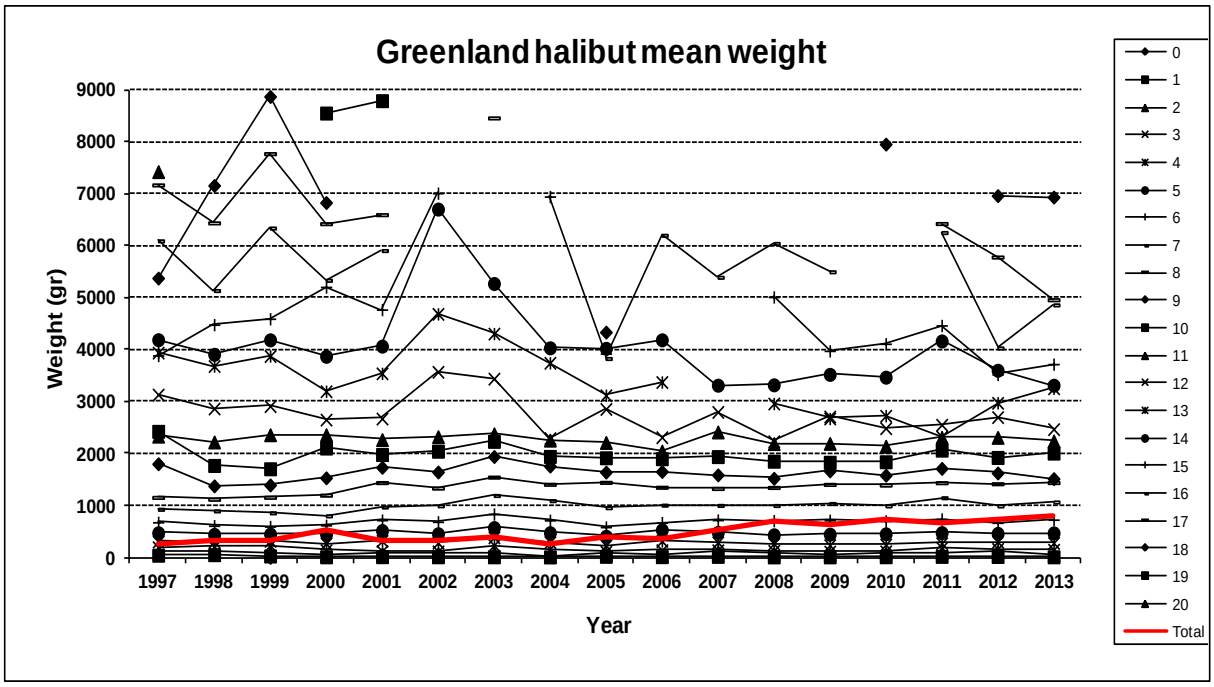

Figure 8.- Greenland halibut mean weight (gr) at age on NAFO 3NO: 1997-2013. Data from 2009 to 2013 are in Table 11; data for 1997-2008 can be seen in SCR Doc 13/10.

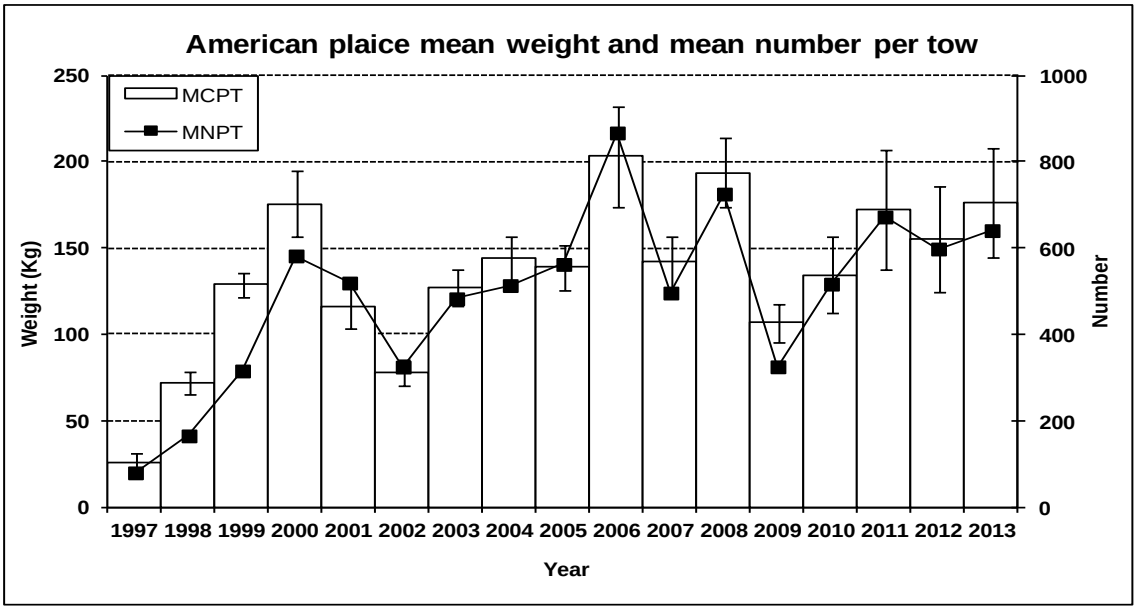

Figure 9.- American plaice stratified mean catches in Kg and ±SD by year and mean number by year. Spanish Spring surveys in NAFO Div. 3NO: 1997-2013.

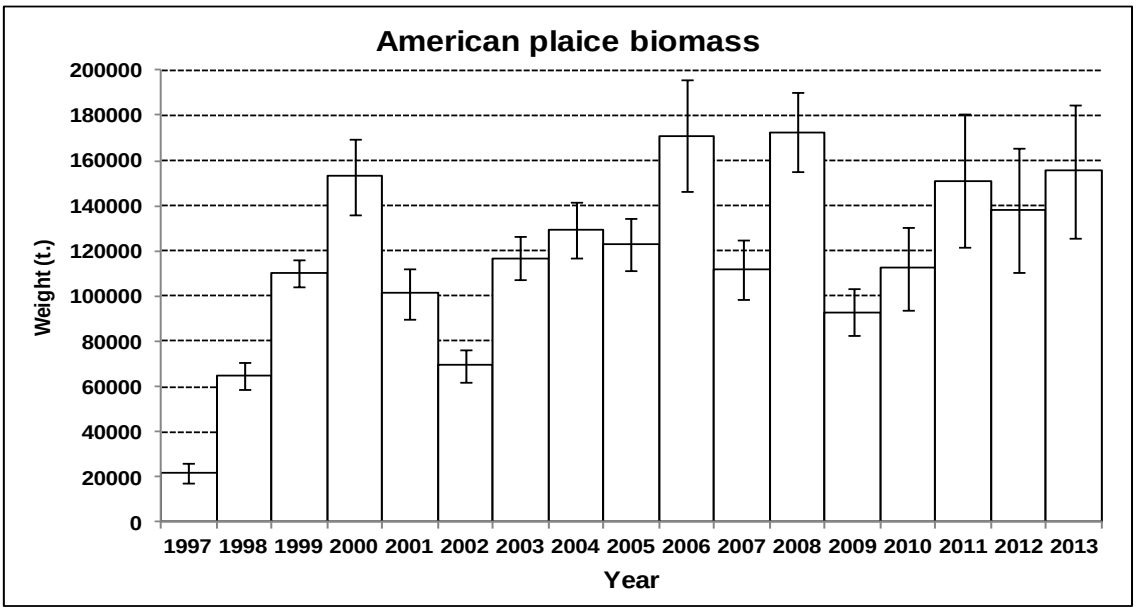

Figure 10.- American plaice biomass calculated by the swept method in tons and ±SD by year. Spanish Spring surveys in NAFO Div. 3NO: 1997-2013.

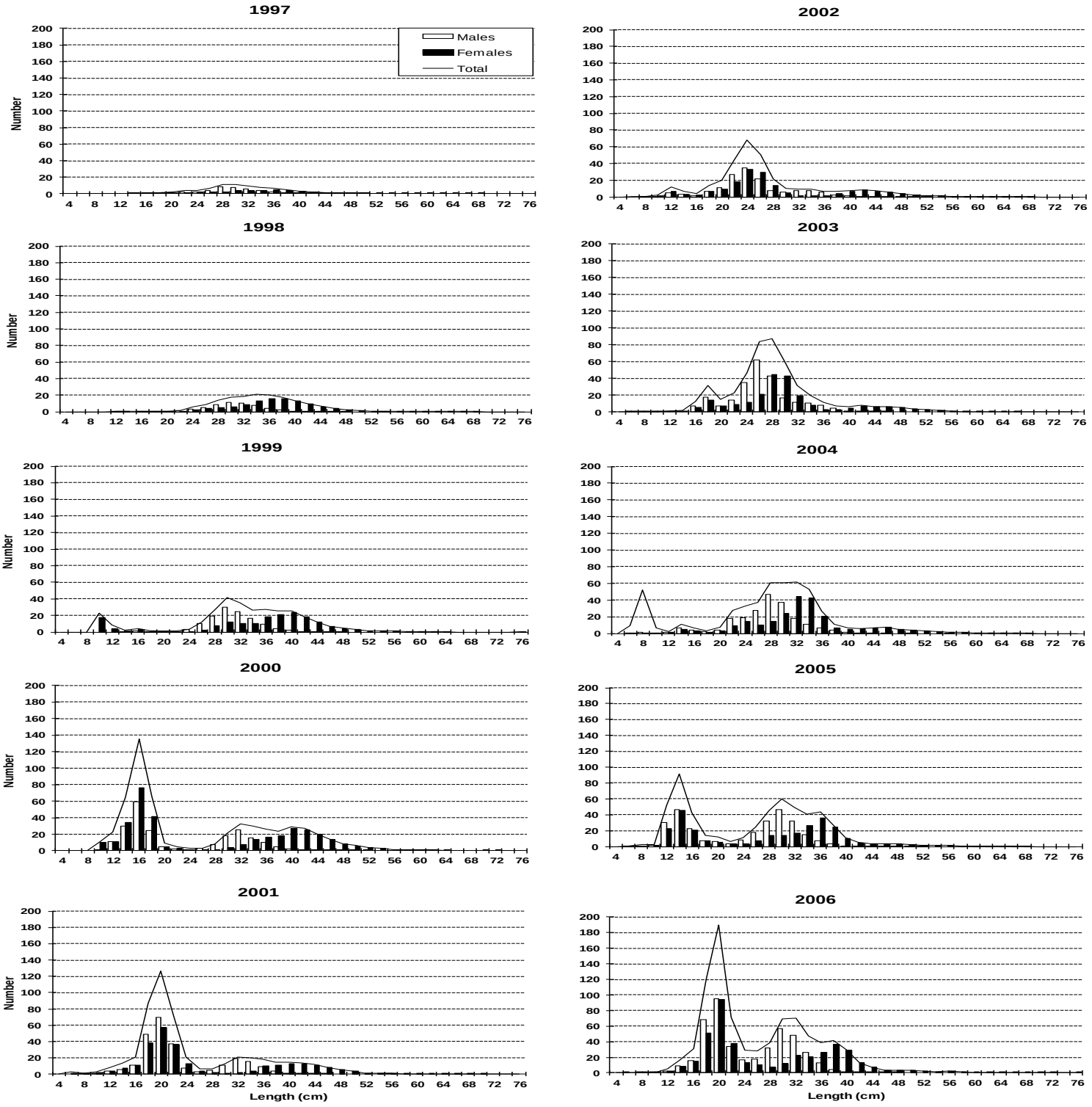

Figure 11.- American plaice length distribution (cm) on NAFO 3NO: 1997-2013. Mean catches per tow number. Data from 2009 to 2013 are in Table 17; data for 1997-2008 can be seen in SCR Doc 13/10.

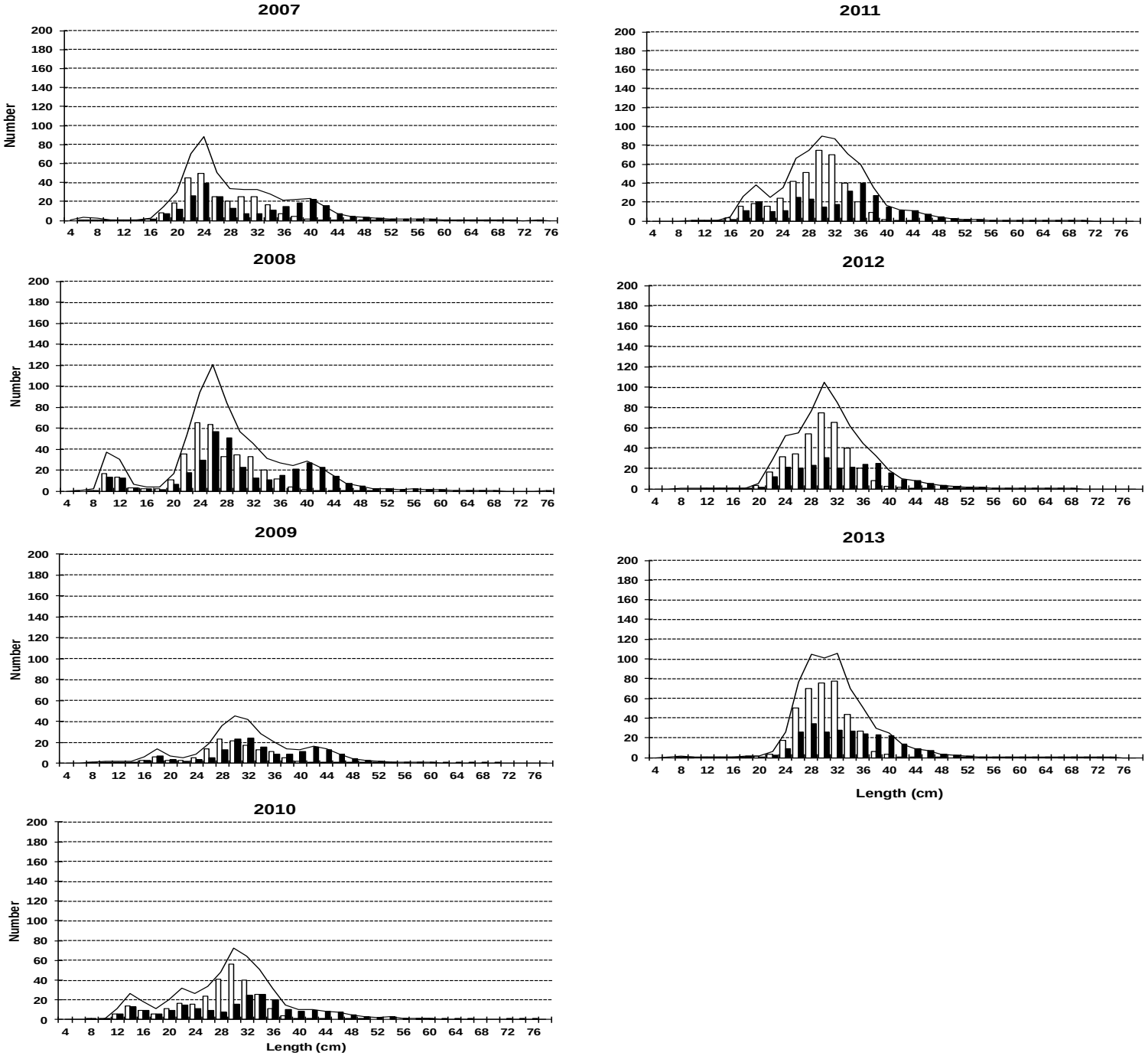

Figure 11 (cont.).- American plaice length distribution (cm) on NAFO 3NO: 1997-2013. Mean catches per tow number. Data from 2009 to 2013 are in Table 17; data for 1997-2008 can be seen in SCR Doc 13/10.

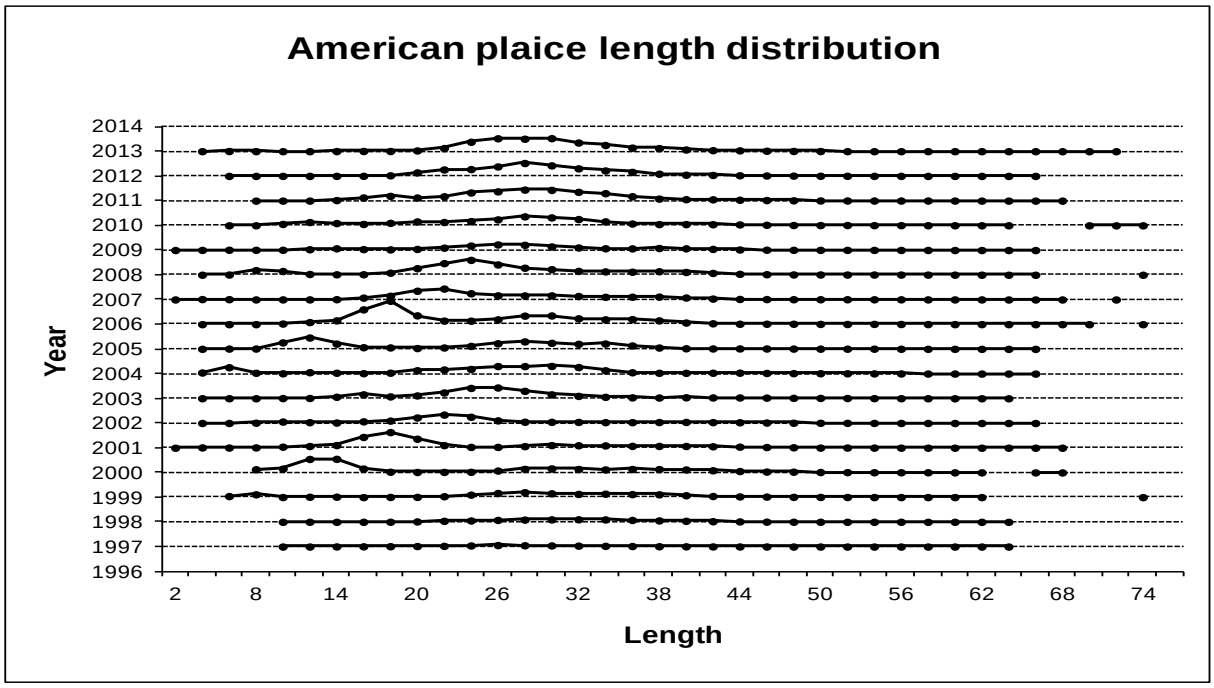

Figure 12.- American plaice mean catches per tow by length (cm) on NAFO 3NO: 1997-2013. Data from 2009 to 2013 are in Table 17; data for 1997-2008 can be seen in SCR Doc 13/10.

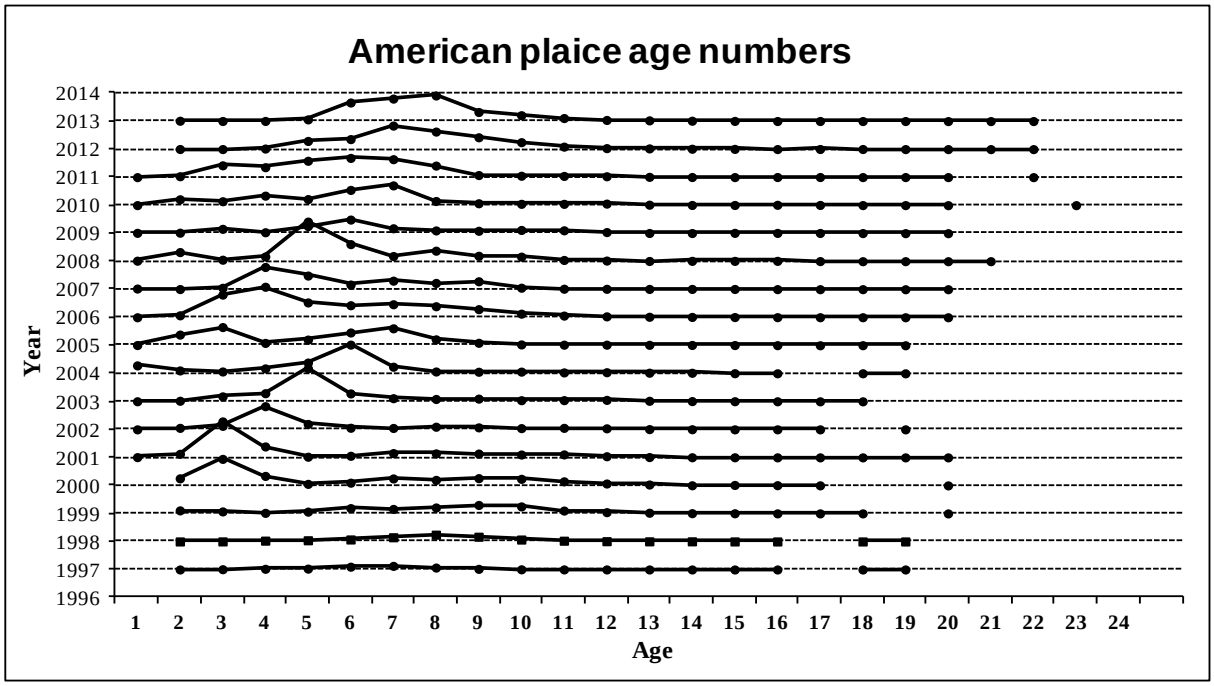

Figure 13.- American plaice mean catches per tow by age on NAFO 3NO: 1997-2013. Data from 2009 to 2013 are in Table 18; data for 1997-2008 can be seen in SCR Doc 13/10.

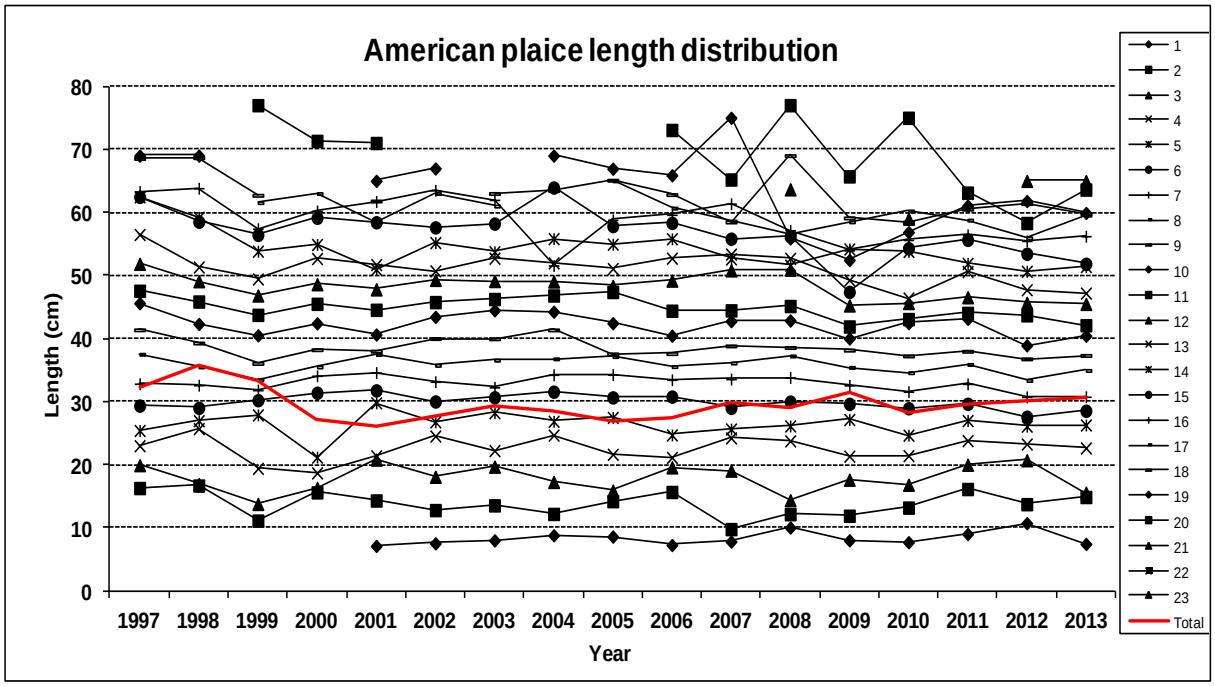

Figure 14.- American plaice mean length (cm) at age on NAFO 3NO: 1997-2013. Data from 2009 to 2013 are in Table 19; data for 1997-2008 can be seen in SCR Doc 13/10.

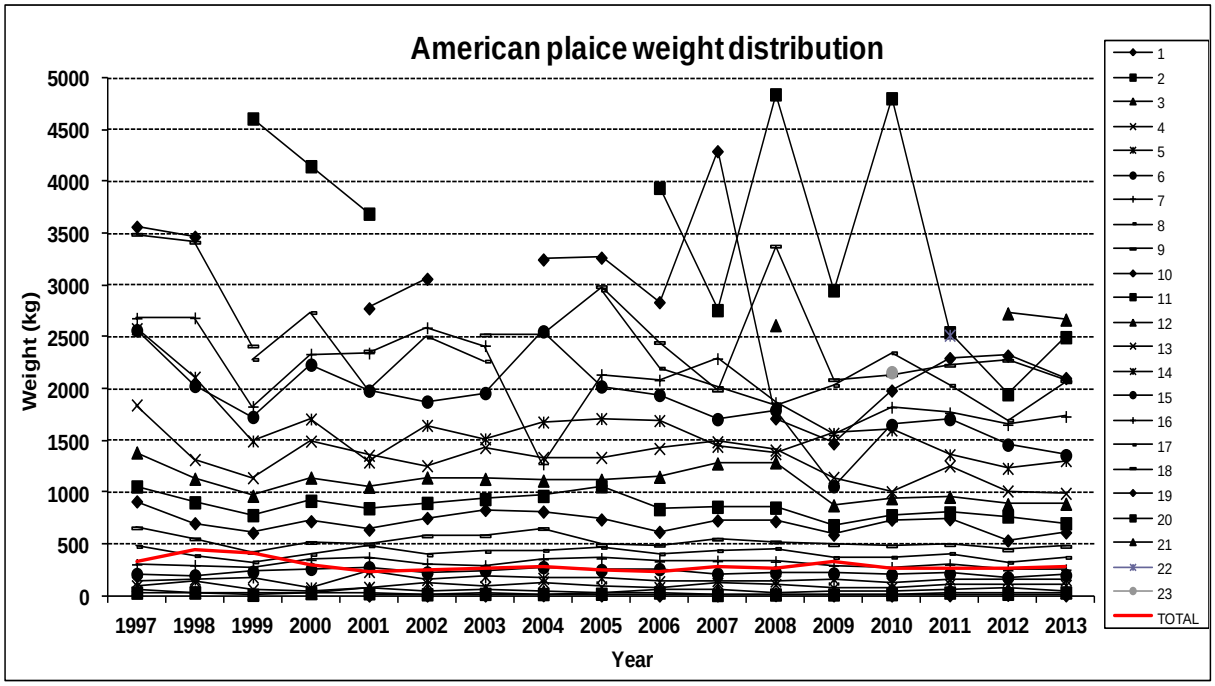

Figure 15.- American plaice mean weight (gr) at age on NAFO 3NO: 1997-2013. Data from 2009 to 2013 are in Table 20; data for 1997-2008 can be seen in SCR Doc 13/10.

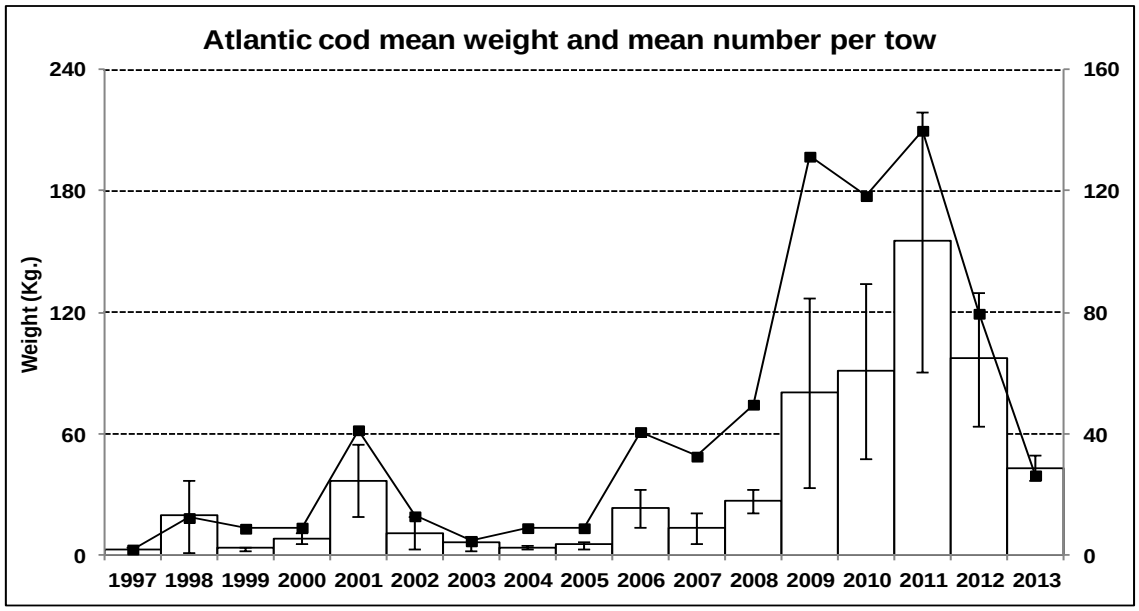

Figure 16.- Atlantic cod stratified mean catches in Kg and ±SD by year and mean number by year. Spanish Spring surveys in NAFO Div. 3NO: 1997-2013.

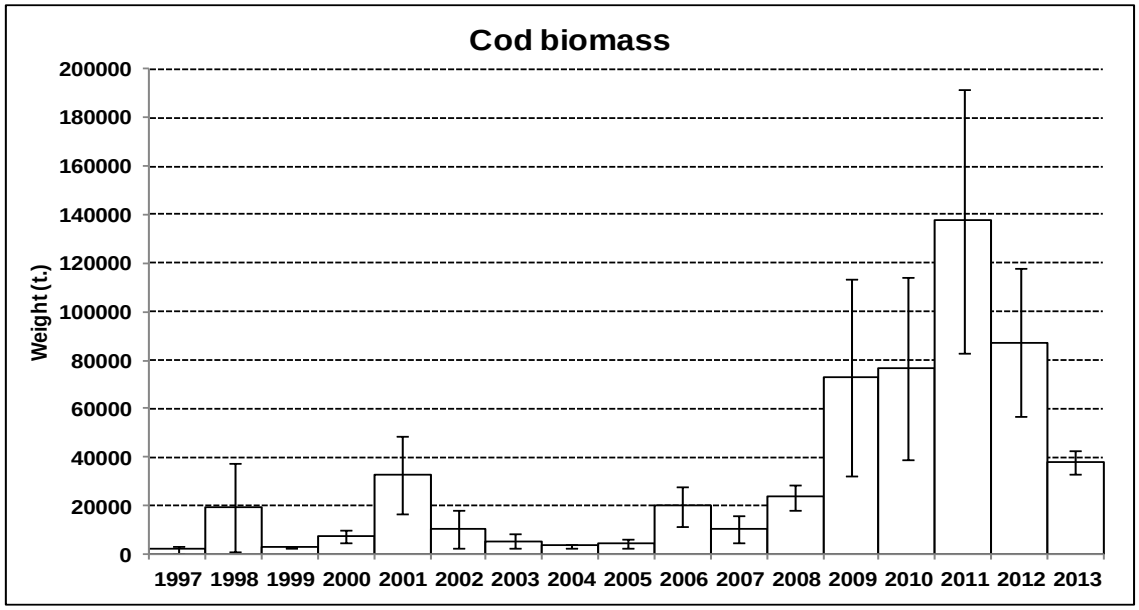

Figure 17.- Atlantic cod biomass calculated by the swept method in tons and ±SD by year. Spanish Spring surveys in NAFO Div. 3NO: 1997-2013.

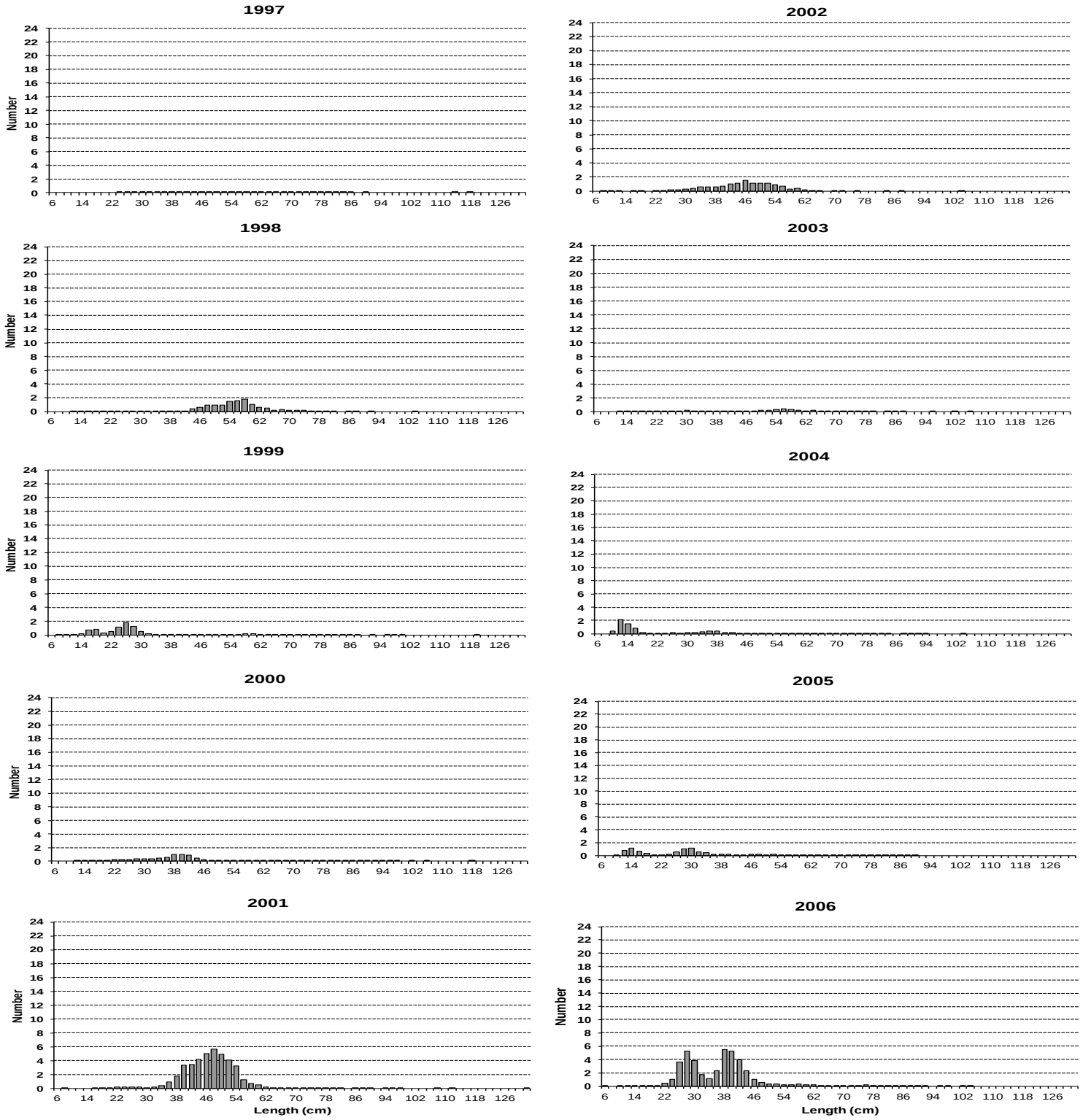

Figure 18.- Atlantic cod length distribution (cm) on NAFO 3NO: 1997-2013. Mean catches per tow number. Data from 2009 to 2013 are in Table 26; data for 1997-2008 can be seen in SCR Doc 13/10.

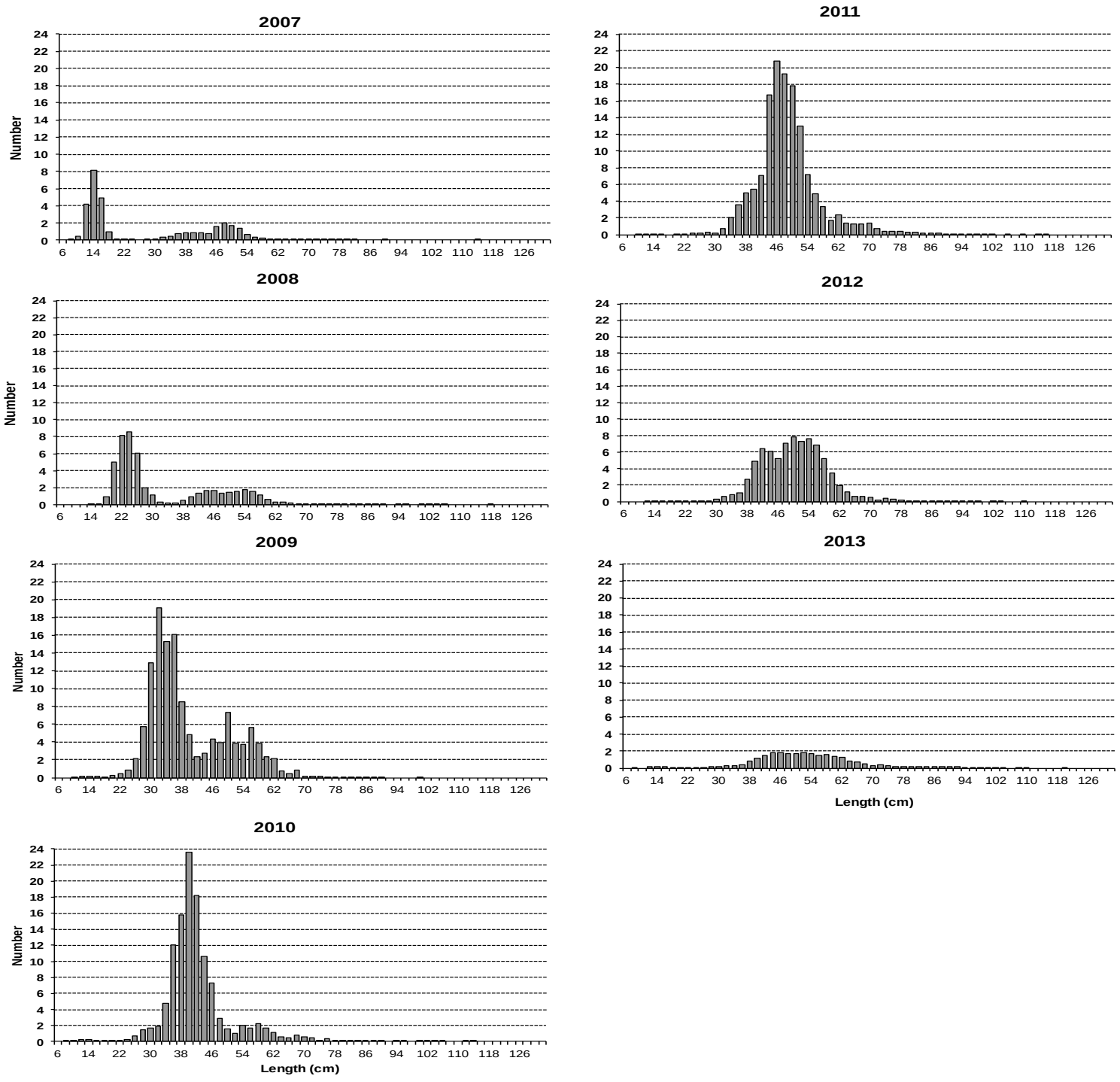

Figure 18 (cont.).- Atlantic cod length distribution (cm) on NAFO 3NO: 1997-2013. Mean catches per tow number. Data from 2009 to 2013 are in Table 26; data for 1997-2008 can be seen in SCR Doc 13/10.

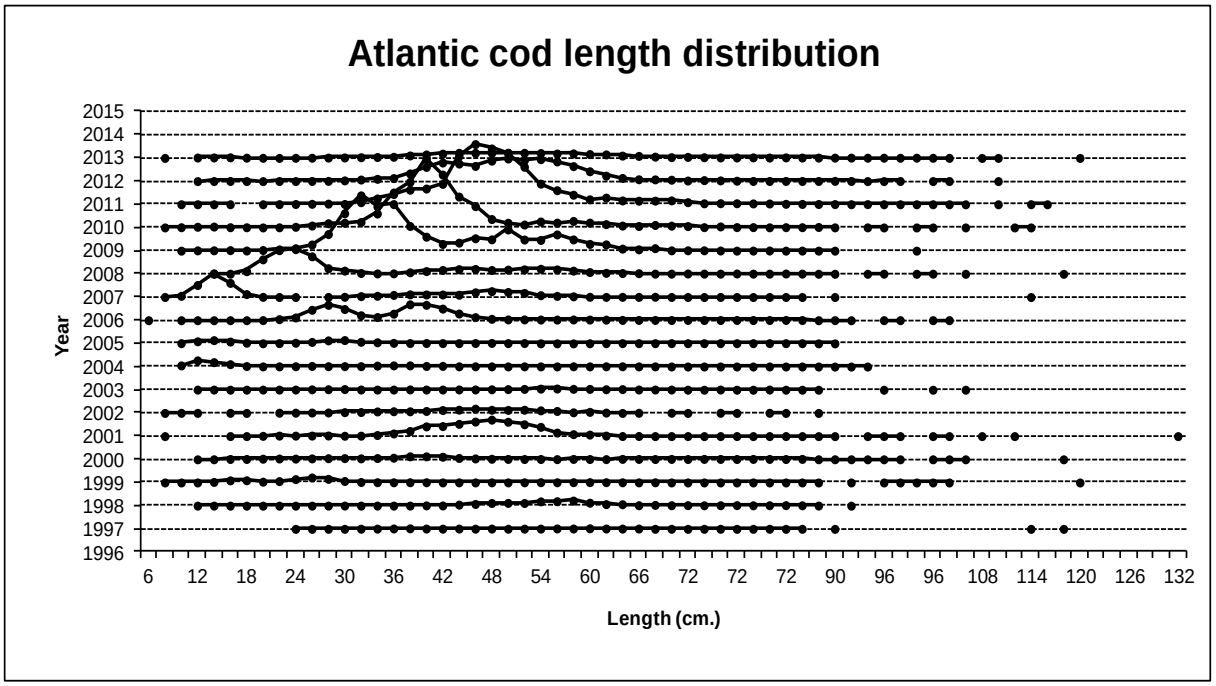

Figure 19.- Atlantic cod stratified mean catches in Kg and ±SD by year and mean number by year. Spanish Spring surveys in NAFO Div. 3NO: 1997-2013. Data from 2009 to 2013 are in Table 26; data for 1997-2008 can be seen in SCR Doc 13/10.

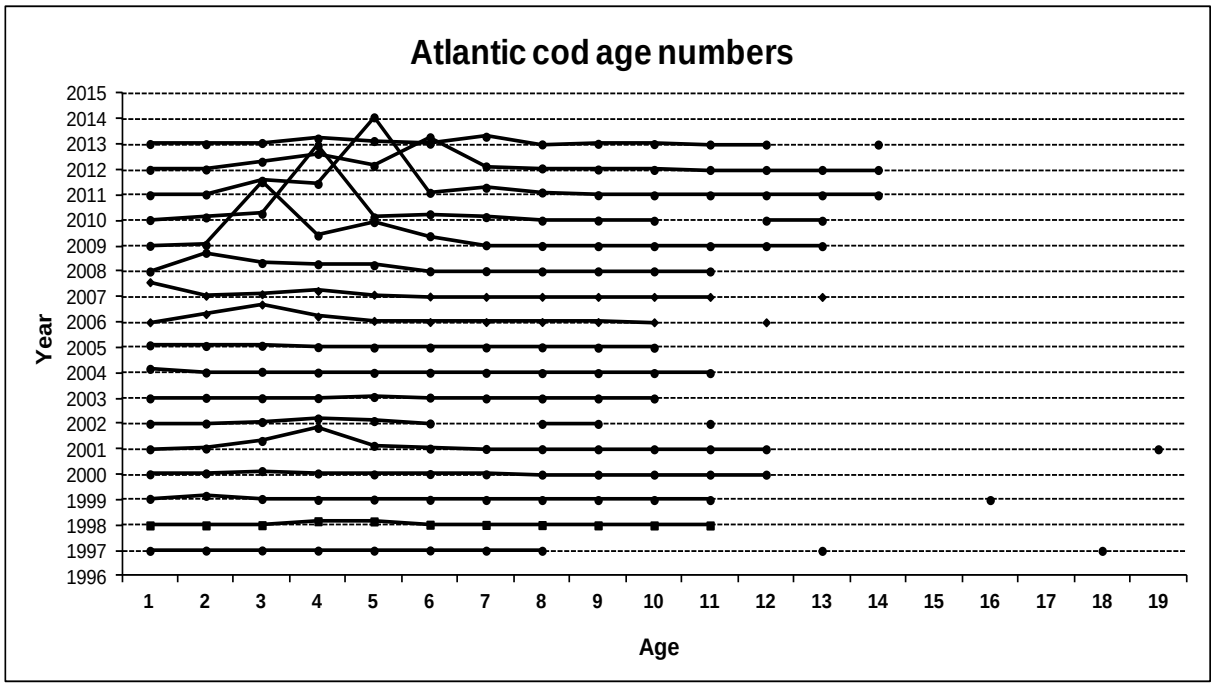

Figure 20.- Atlantic cod biomass calculated by the swept method in tons and ±SD by year. Spanish Spring surveys in NAFO Div. 3NO: 1997-2013. Data from 2009 to 2013 are in Table 27; data for 1997-2008 can be seen in SCR Doc 13/10.

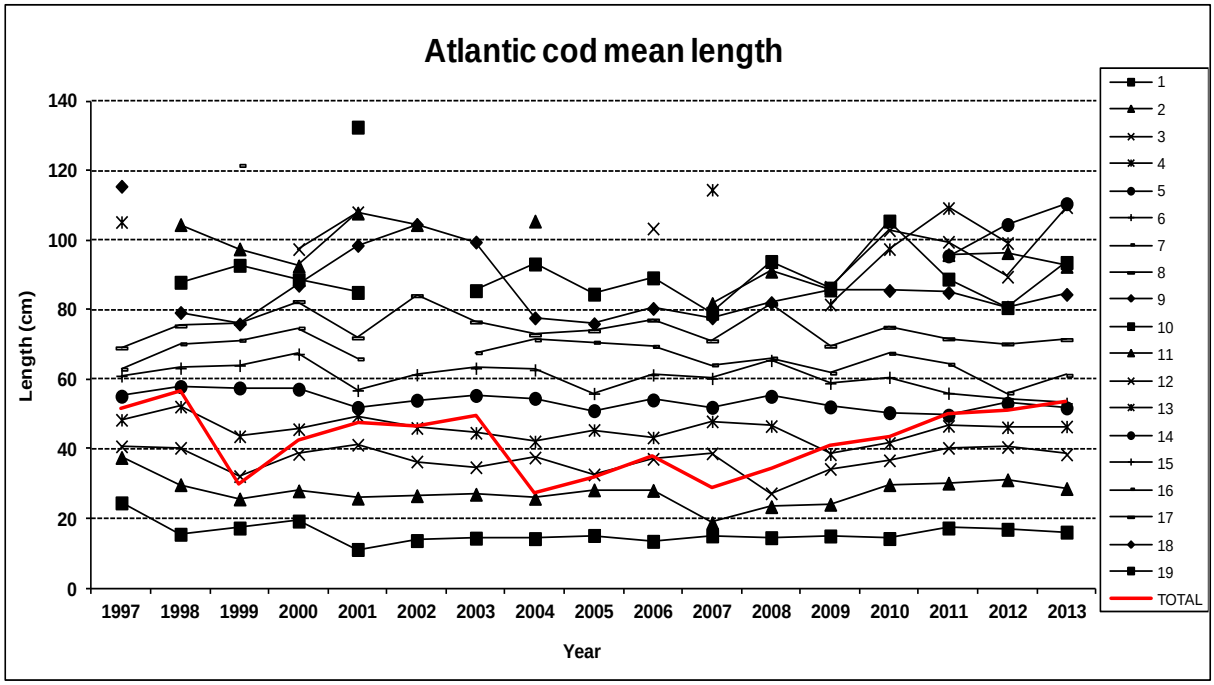

Figure 21.- Atlantic cod mean length (cm) at age on NAFO 3NO: 1997-2013. Ages from 1 to 19. Data from 2009 to 2013 are in Table 28; data for 1997-2008 can be seen in SCR Doc 13/10.

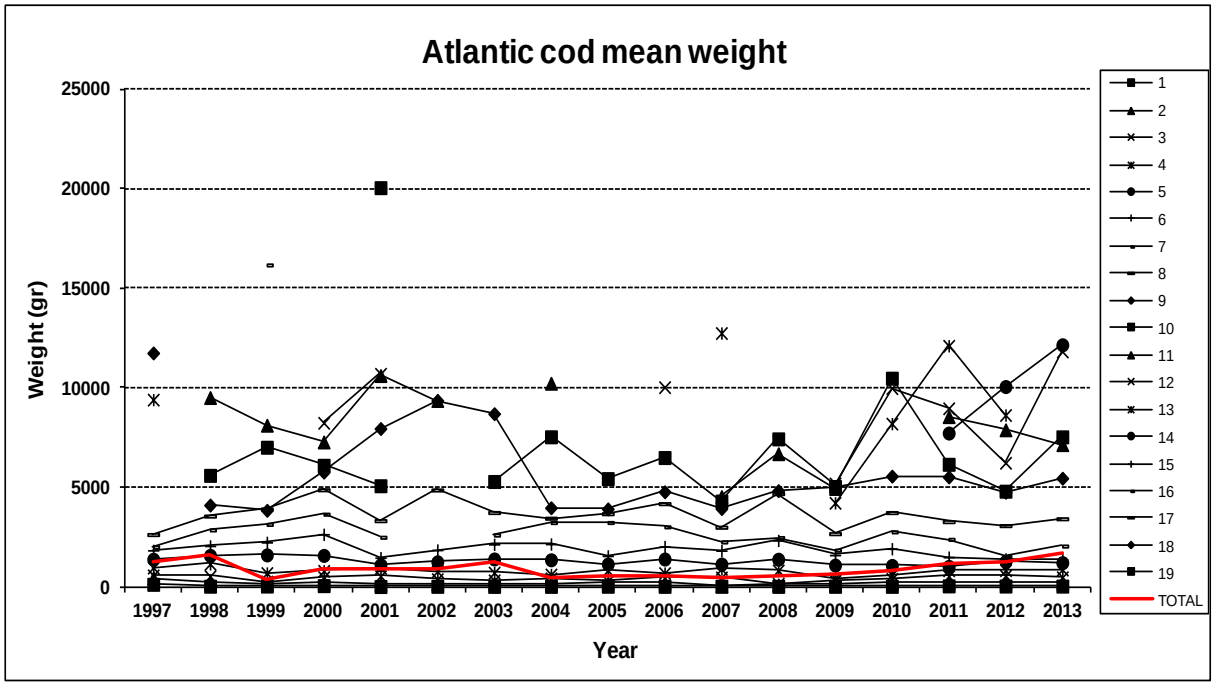

Figure 22.- Atlantic cod mean weight (gr) at age on NAFO 3NO: 1997-2013. Ages from 1 to 19. Data from 2009 to 2013 are in Table 29; data for 1997-2008 can be seen in SCR Doc 13/10.